The CSC Statement of Requirements - Pushing the Envelope?"

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Maritime Security Program Workshop:

“National Shipbuilding Procurement Strategy (NSPS) – Charting the Course."

7:45 a.m to 6:00 p.m – 6 June 2014

Outline

- Project Overview
- Global Warship Environment
- Warship Trends
- Comparison with Canadian Surface Combatant Draft Statement Of Requirement
- Conclusion

Project Overview

The CSC project will renew the Royal Canadian Navy surface combat fleet by replacing the capabilities provided by the destroyers (Iroquois-class) and the multi-role patrol frigates (Halifax-class).

-$26 Billion

-2020 Cut Steel

-2025 First delivery

Two Variants:

-Area Air Defence and Task Group Command and Control (AAD/TG)

-General Purpose (GP)

CSC Concept Of Operations

- Task group (TG) environment
- Open ocean and littoral operational environments
- Increased requirement for Joint Operations

CSC Statement of Requirements

- Currently in draft form
- Result of in-house DND analysis (with whole of government input)
- Extensive DND and DRDC modeling, research and simulation. (Synthetic Environment Based Architecture)
- Four separate DND-PWGSC-Industry Technical Engagement With Industry (TIE) consults
- Will be ready

Global Warship Environment - 20 Years Hence

Rear Admiral Rowden (USN) :

- The world will be more multi-polar than it is now, with the United States, China, Russia, India, Brazil, and the Eurozone all vying for resources and for economic, political, and sometimes, military power and influence.
- The United States will maintain [powerful] naval forces forward, present, visible, and ready to protect and sustain America' global interests in world of changing power dynamics.
- The volume of ocean-borne trade will dramatically increase.
- Absent conflict, the resources allocated to the Navy in constant dollars will not dramatically rise or decline.
- The overwhelming majority of ships in the 2034 surface force is currently in service or in advanced design stages.

RADM Rowden, USNIP Jan 2014, "Building the Surface Fleet of Tomorrow"

CINCPAC on Climate Change

On climate change's impact on coastal populations: "If it goes bad, you could have hundreds of thousands or millions of people displaced and then security will start to crumble pretty quickly.''

A significant upheaval related to the warming planet "is probably the most likely thing that is going to happen . . . That will cripple the security environment, probably more likely than the other scenarios we all often talk about.''

"Chief of US Pacific forces calls climate biggest worry," Bryan Bender | GLOBE (BOSTON) STAFF MARCH 09, 2013

In the Near Term:

- South China Sea disputes and Pacific Pivot
- Resurgent Russia
- Western land presence being replaced by naval forces in Middle East/SE Asia
- In parallel a significant call for USN on station ships for BMD

Warship Trends

-last 20 years have been marked and emphasis on strike, support to land ops, maritime interdiction operations.

-there is a call to return to war at sea capabilities

-ASW is being re-emphasized

-USN is predicting “a return to Cold War-era electronic warfare concepts of operation.”

Limited Dollars

call for:

- Flexibility
- Commonality
- Scalability
- Modularity

Modularity

In Design

In Employment

Bloom and Voss Meko Modular Design

Mine hunting module going into LCS Freedom

General Purpose Capability

LCS limited to 32

"Given continued fiscal constraints, we must direct shipbuilding resources toward platforms that can operate in every region and along the full spectrum of conflict." (SecDef Hagel, 24 Feb 2014)

Reduced Crewing

- Initial hope for a 100 destroyer crew
- But considerable doubts since:
  - LCS
  - FREMM – is it 90 or 155?
  - HMS Daring – 187 or is it 232?

Stealth

Active Electronically Scanned Arrays

Air and Missile Defence Radar

Advanced Phased Array Radar

Electric Propulsion

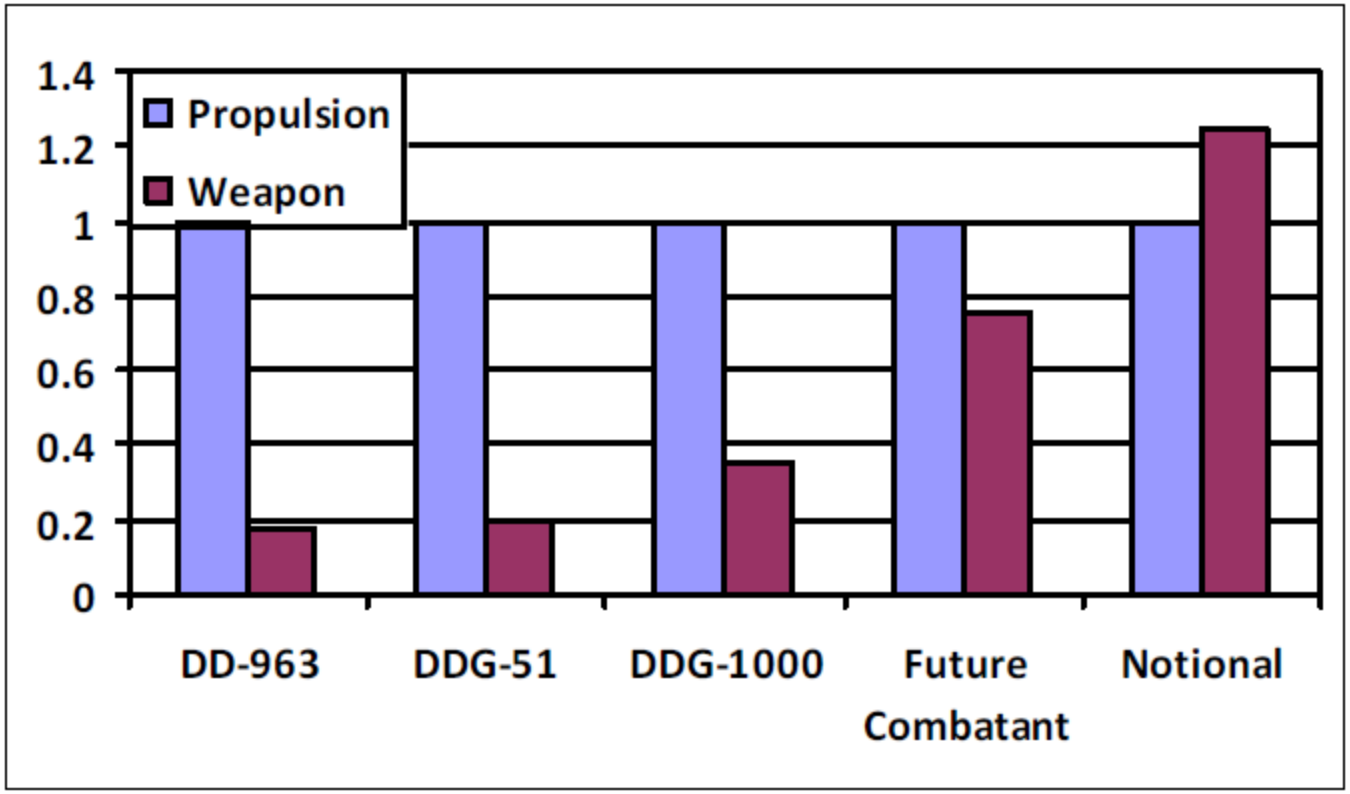
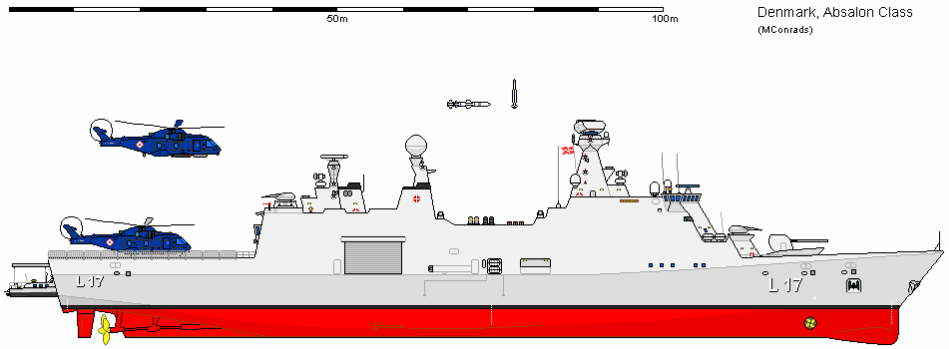


Figure.1: Trend of onboard warship power demands [1]

Twin Helos/ AUV

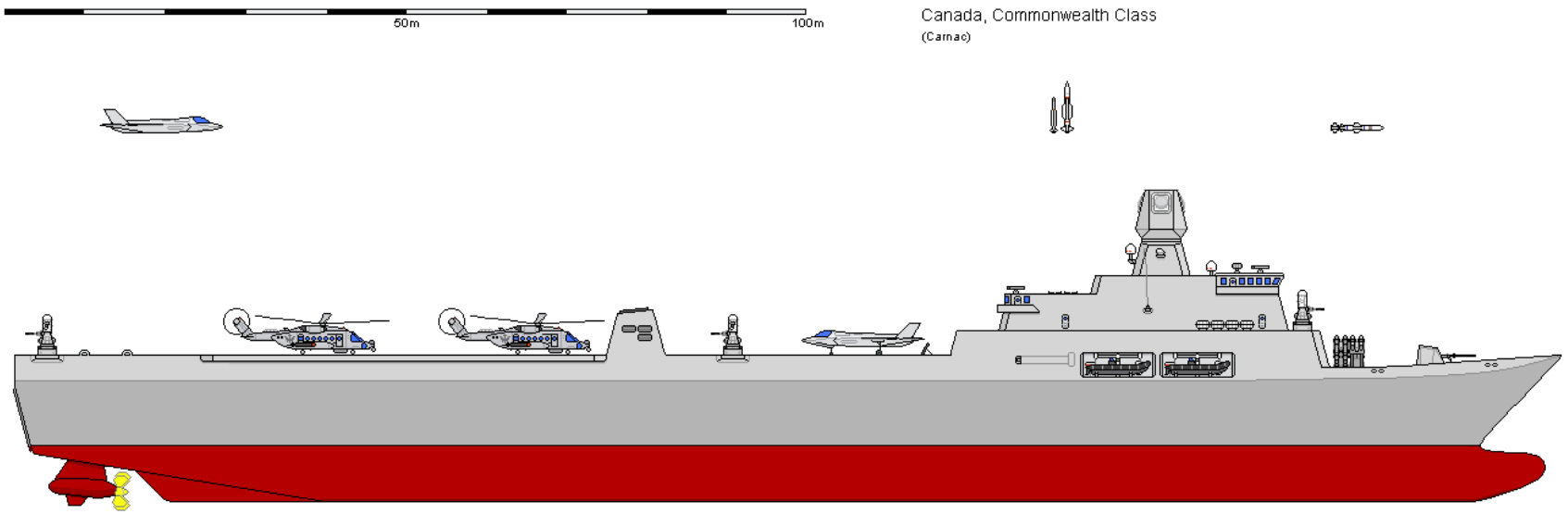
JDS AKIKUZI

Cargo



Absalon Class

Which can get carried away



[Canadian Surface Combatants - Carnac's Canucks]

http://www.shipbucket.com/forums/viewtopic.php?f=15&t=3657&start=30

Large Magazines

Chinese Type 15

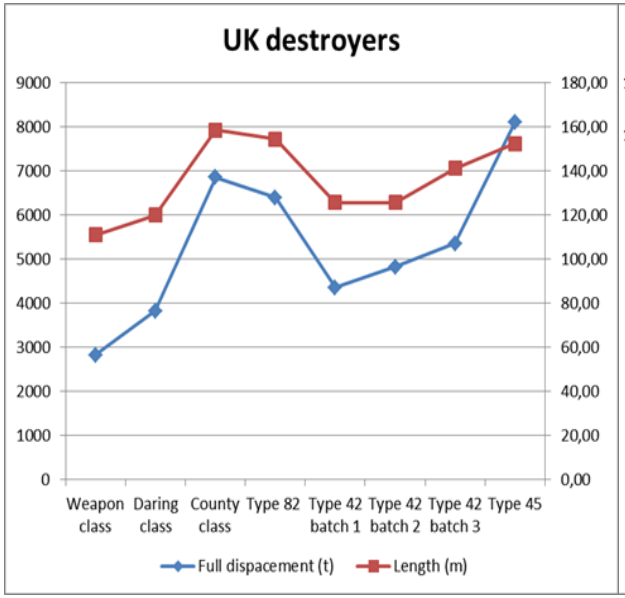
US Mk 41 VLS

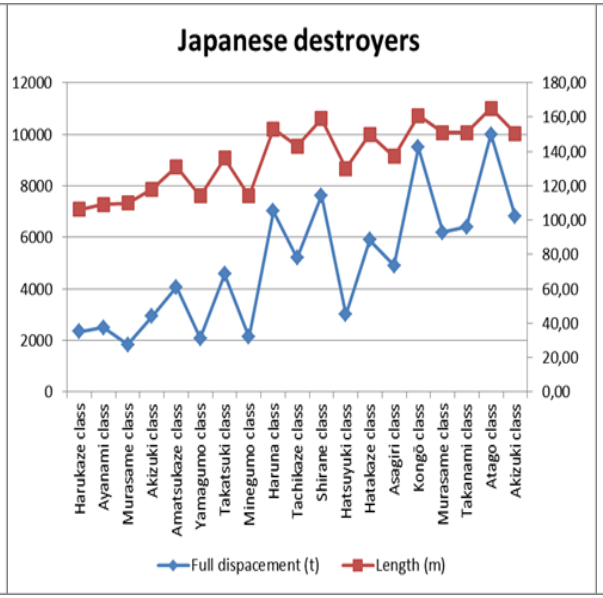
EU Sylver

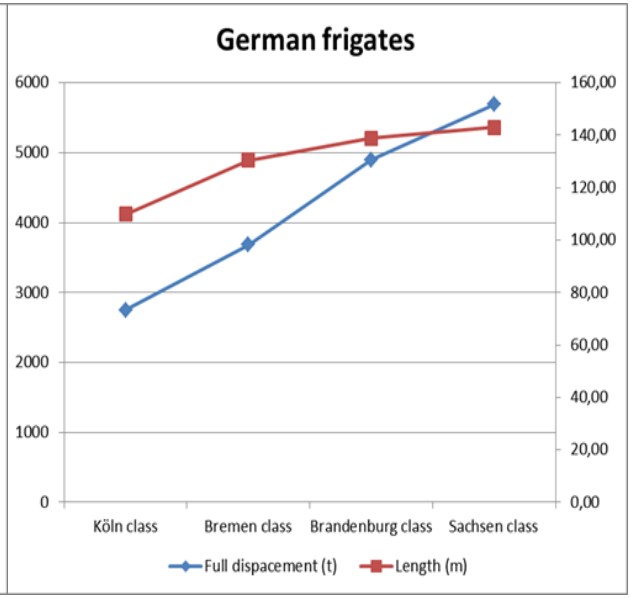
CNS TOTORO

Larger

Larger


UK destroyers
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
180,00
160,00
140,00
120,00
100,00
80,00
60,00
40,00
20,00
0,00
Weapon class
Daring class
County class
Type 82
Type 42 batch 1
Type 42 batch 2
Type 42 batch 3
Type 45
Full dispacement (t)
Length (m)


Japanese destroyers
12000
10000
8000
6000
4000
2000
0
180,00
160,00
140,00
120,00
100,00
80,00
60,00
40,00
20,00
0,00
Harukaze class
Ayanami class
Murasame class
Akizuki class
Amatsukaze class
Yamagumo class
Takatsuki class
Minegumo class
Haruna class
Tachikaze class
Shirane class
Hatsuyuki class
Hatakaze class
Asagiri class
Kongō class
Murasame class
Takanami class
Atago class
Akizuki class
Full dispacement (t)
Length (m)


German frigates
6000
5000
4000
3000
2000
1000
0
160,00
140,00
120,00
100,00
80,00
60,00
40,00
20,00
0,00
Köln class
Bremen class
Brandenburg class
Sachsen class
Full dispacement (t)
Length (m)

US Navy destroyers

Class name	First commissioned	Full dispacement (t)	Length (m)
Mitscher class	1953	4855	150,00
Forrest Sherman class	1955	4050	127,00
Charles F. Adams class	1960	4526	133,00
Farragut class	1960	5648	156,20
Spruance class	1975	8040	172,00
Kidd class	1981	9783	172,00
Arleigh Burke Flight I class	1991	8315	154,00
Arleigh Burke Flight II class	1998	8400	154,00
Arleigh Burke Flight IIA class	2000	9200	155,00
Zumwalt class	2014	14564	180,00

Marine Nationale frigates

Class name	First commissioned	Full dispacement (t)	Length (m)
Le Normand class	1956	1795	99,30
Commandant Rivière class	1962	2230	98,00
Suffren class	1967	5335	158,00
Tourville class	1974	6100	152,75
Georges Leygues class	1979	4500	139,00
Cassard class	1988	4500	139,00
Floreal class	1992	2950	93,50
La Fayette class	1996	3600	125,00
Horizon class	2010	6635	153,00
Aquitaine class	2012	6000	142,00

Larger

Destroyer growth

from earliest to latest class

Navy	Displacement	Length
US Navy	200%	20%
JMSDF	191%	42%
Royal Navy	187%	37%
Soviet Navy	186%	34%
PLAN	93%	17%
Marine Nationale	43%	3%
Deutsche Marine	17%	0%
Average	*131%*	*22%*

Frigate growth

from earliest to latest class

Navy	Displacement	Length
Soviet Navy	255%	57%
Marine Nationale	234%	43%
PLAN	190%	46%
JMSDF	138%	24%
Deutsche Marine	107%	30%
Royal Navy	91%	42%
US Navy	42%	20%
Average	*151%*	*38%*

http://www.militaryphotos.net/forums/showthread.php?212661-Warship-size-inflation-during-the-Cold-War

Advanced, Linked ASW

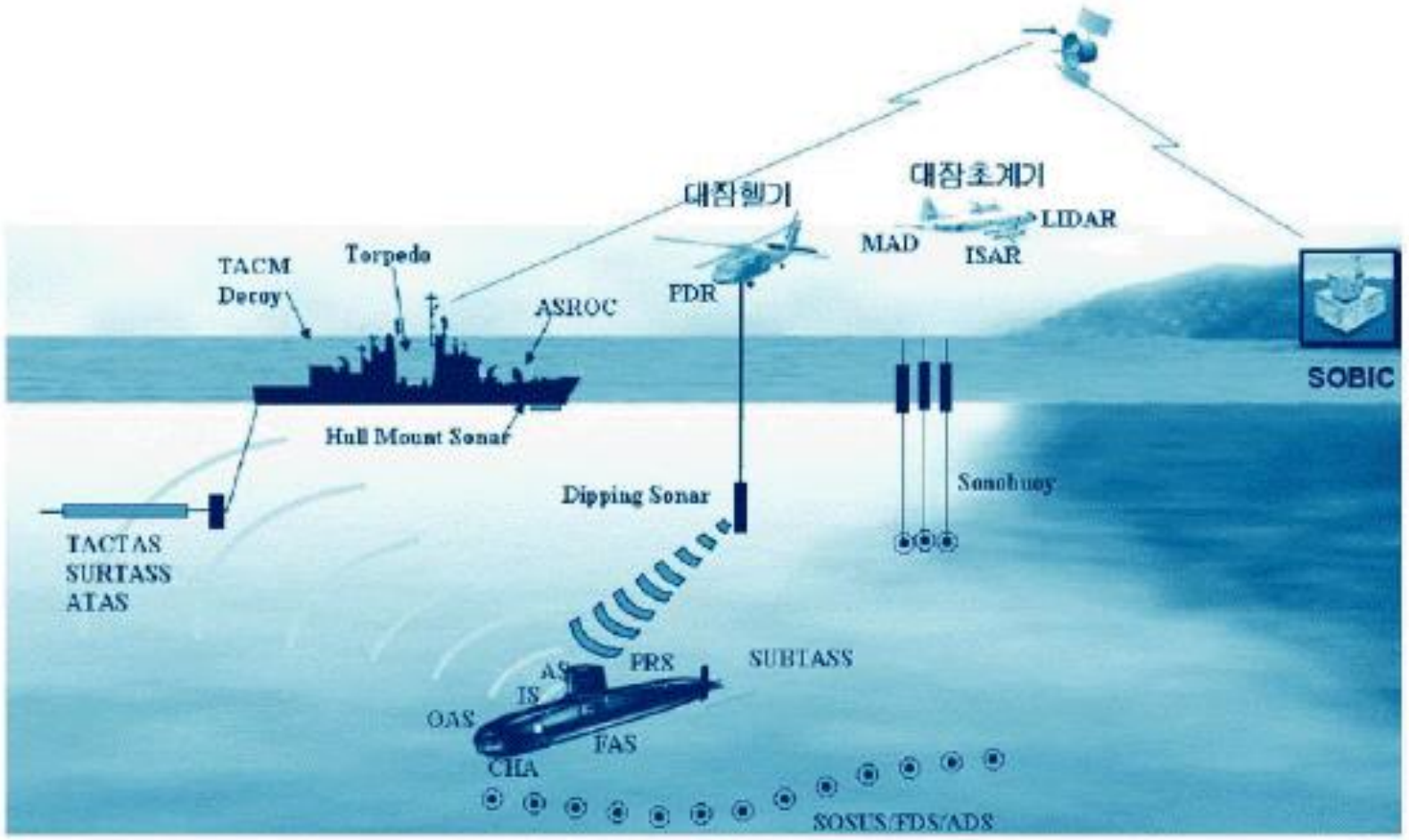


그림 1. 잠수함 탐지체계 종류

Partnering/Design Sharing

Legend Class –
USCG – and USN?

APAR - NE, GE, DK

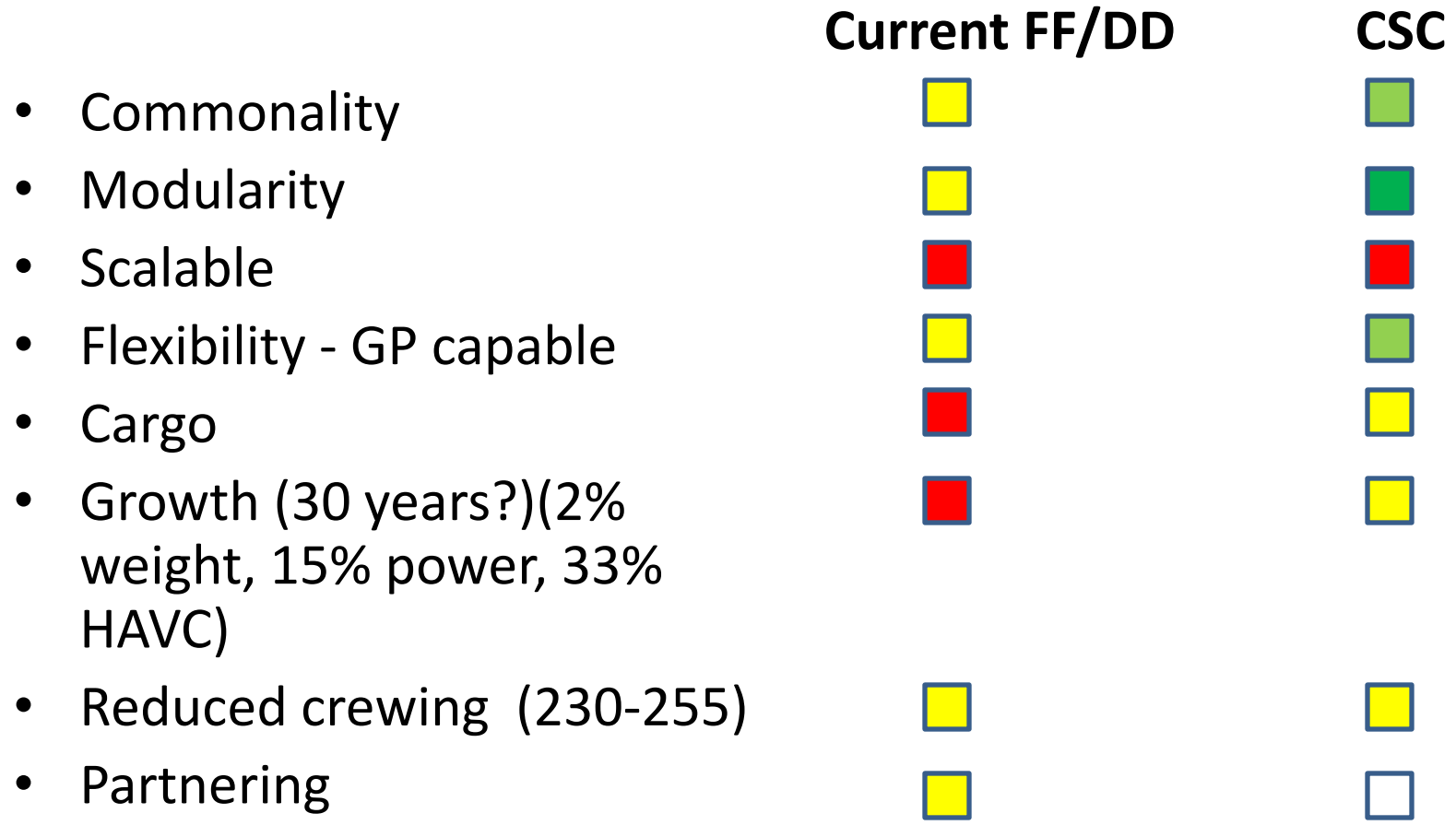
Principal Anti Air Missile System (PAAMS)
- FR, UK, IT

Bazan Class – SP, NO

Horizon Class?
NFR 90?

Berlin Class – GE, CA

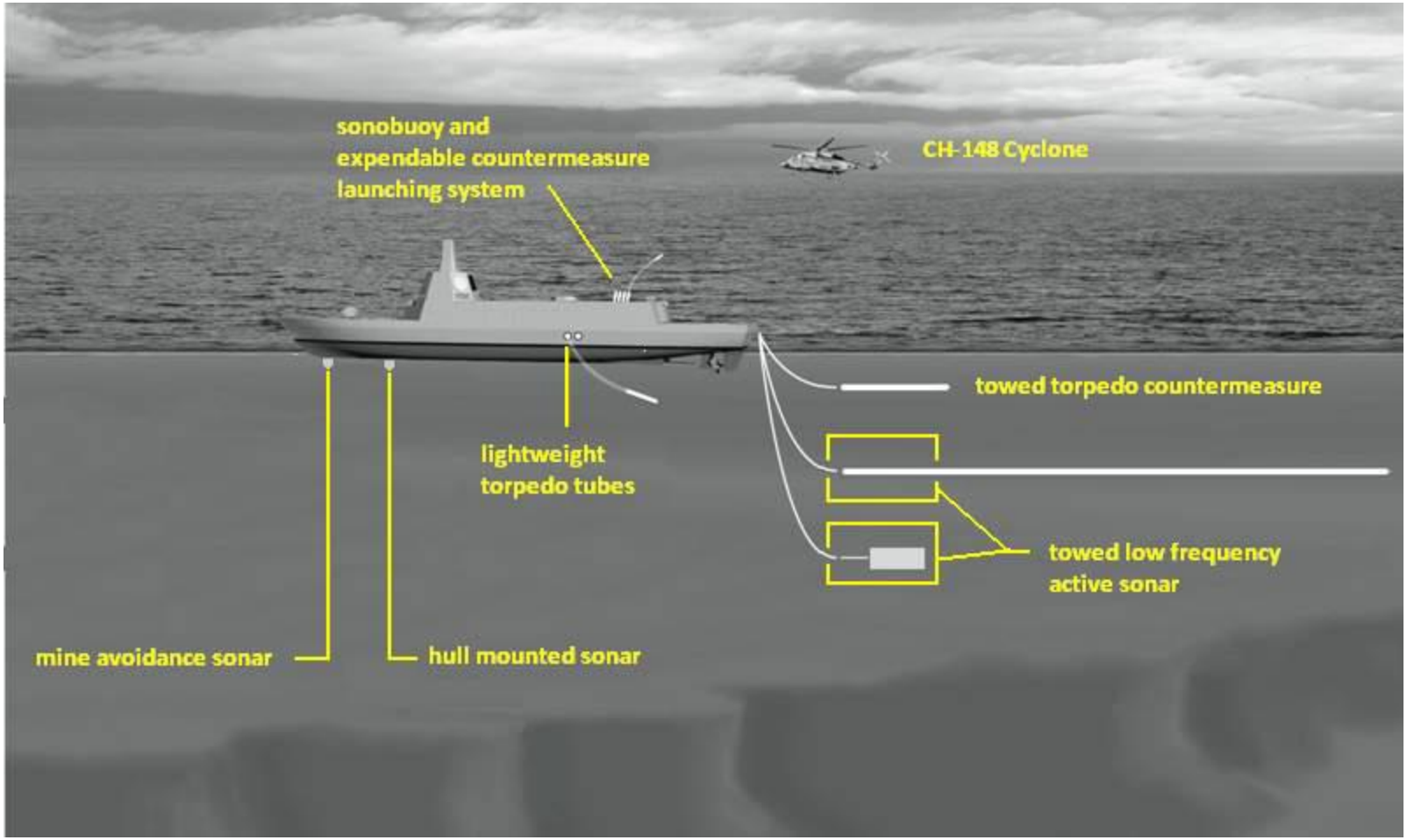
The CSC SOR Concept



Platform

	Current FF/DD	CSC
• Size (155 meter limit)		
• Stealth		
• Signature management (RIMPASSE)		
• 2 helo or helo + AUV		
• Electric Drive		
• Arctic (5kt brash ice + accretion limit)		

Summary of Underwater Capability



ASW

	Current FF/DD	CSC
• Low frequency active array	■	■
• Bistatic operations	■	■
• Offboard decoys	■	■
• Minehunting sonar	■	■

Summary of AWW Capability

Passive Sensors

- Electronic support
- Laser detection
- EA passive
- EOIR ST

Active Sensors

- 3D Long range radar / IFF (AESA)
- Medium range radar / IFF
- Effectors control
- EA active
- Laser countermeasures

ASuW & NFS Effectors

- ASuW / Land attack missile
- Main gun
- Secondary gun

AAW Effectors

- Long range SAM
- Short range SAM
- CIADS

AAW

	Current FF/DD	CSC
• AESA		
• VLS (24-32 Cell)		
• BMD (limited)		
• Sea Based Air Defence		
• Short and long range SAM		
• CEC		
• Rail gun, hyper velocity		

ASUW

	Current Fleet	CSC
• SSM		
• NGS 5 in gun and land attack missile		

Conclusions

- The draft CSC SOR moves well beyond the status quo
- It also responds well to emerging international warship trends
- The central issue is one of cost versus the number of ships versus the capabilities sought in the SOR

Conclusions

Even with the issues of cost and timing, the CSC SOR process appears to be a sound one and one well-suited to addressing them because:

- It is well grounded vis the evolving international maritime scene
- It has been the result of extensive industry consultation
- It is supported by an extensive in-house modeling effort (Synthetic Environment Based Acquisition)
- It admits that many of draft SOR are aspirational and may have to be considered for much later insertions

Questions

MISC SLIDES

Rendering of a concept design of the Canadian Surface Combatant ship

BMT Fleet Technology Ltd.

http://www.journal.forces.gc.ca/vol13/no1/page7-eng.asp

http://www.casr.ca/doc-loi-navy-csc-project.htm

CSC Project candidate?
French FREMM-based FREDA

Advanced, Linked ASW

International Variant of Freedom LCS