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Department of Defense  
OFFICE OF PREPUBLICATION AND SECURITY REVIEW



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# CONSTELLATION CLASS FRIGATE FFG (62)

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**December 2021 Selected Acquisition Report (SAR)**



DECEMBER 31, 2021  
DEPARTMENT OF THE NAVY

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## Program Manager

**Name:** Captain Kevin R. Smith,

**Date Assigned:** October 01, 2020

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## Mission and Description

The Constellation Class Frigate will be a highly capable and survivable multi-mission platform designed for operations in blue water and the littoral environments. The platform will be able to conduct independent operations or as part of Carrier/Expeditionary Strike Groups or Surface Action Groups manned and equipped for Navy Composite Warfare and Joint Maritime Operations. The FFG 62 program will conduct offensive and defensive Anti-Submarine Warfare, Surface Warfare, Electromagnetic Warfare/Information Operations, and Air Warfare operations.

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## Executive Summary

The Constellation Class Frigate program was established in a two phase acquisition approach. Phase I: FFG 62 Conceptual Design (CD) was intended to mature Industry parent designs toward meeting FFG 62 requirements. It was conducted as a Full and Open Competition with five CD contracts awarded on February 16, 2018. The duration of Phase I was from February 2018 – June 2019. After Phase I completed, the Program released the Request for Proposals (RFP) for Phase II: FFG 62 Detail Design and Construction (DD&C) which was also a Full and Open Competition (not limited to CD participants). The program completed the Milestone B statutory requirements, and the contract was awarded to Fincantieri Marinette Marine (FMM) on April 30, 2020 for the design, construction, and delivery of the first ship (FFG 62), with options for construction of nine additional ships. The option for the second ship of the Constellation class (FFG-63) was exercised on May 20, 2021. The program plans to award option two for the third ship (FFG 64) of the class in Q3 FY 2022. The Program of Record for the FFG 62 class is 20 ships.

The program is completing Functional Design and transitioning that design into the 3D product model to support the development of production products. The Navy has certified the Frigate Build Specification and it has been implemented on the contract. In addition, Combat System requirements have been established and equipment procurement for the first two ships is underway. The program is currently finishing the detail design phase and progressing towards required design maturity at the start of construction for the FFG-62 planned for Q4 FY 2022. There are no significant software related issues with this program at this time.

### Significant Accomplishments:

- U.S. Navy exercised the option for the second ship, FFG 63, on May 20, 2021.
- Combat System requirements have been established and Government Furnished Equipment (GFE) procurement is underway.
- Build specification certified by SEA05 June 30, 2021 – No cost contract modification executed August 24, 2021
- Completed Ship Scale Model testing at NSWC Carderock Seakeeping & Maneuvering Basin
- Started the Propulsion Land Based Engineering Site (LBES) Development at NSWC Philadelphia, with the Top Level Requirements defined
- Implemented and executing to statutory Frigate specific propulsion Buy American requirements.

### Significant Issues:

Fincantieri Marinette Marine (FMM) continues to lead the detail design effort for the Constellation Class Frigate. At this time, Government-driven change has been carefully limited and includes:

- Statutory Buy American requirements for propulsion equipment
- High technical and schedule risk redirecting contractor furnished equipment (CFE) for the Vertical Depth Sonar (VDS) from the Raytheon DART VDS to an alternate mature VDS system. Prior to the redirection of VDS CFE, the Navy conducted market research and evaluated multiple vendors based on program requirements and schedule.

### PEO Comments:

After a thorough schedule review and assessment, Fincantieri Marinette Marine (FMM) has recommended an approximately 3 month shift in critical design review (CDR), production readiness review (PRR), and start of production. PEO USC intends to execute this plan. CDR will now be in May, and this remains ahead of the program's APB objective date, although delayed from the aggressive schedule in FMM's original proposal. This change will support achieving a high level of design maturity for CDR and PRR (goal is 80% or greater). PEO USC feels strongly that achieving high design maturity is key for a successful FFG production. FMM assesses they will still deliver the lead ship in 2026.

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*History of Significant Developments Since Program Initiation*

History of Significant Developments Since Program Initiation	
Date	Significant Development Description
April 2020	Guided Missile Frigate (FFG(X)) completed Milestone B with all statutory requirements and the approval to proceed into DD&C
April 2020	The FFG(X) DD&C contract was awarded to Fincantieri Marinette Marine (FMM)
October 2020	Executed FFG (62) Initial Baseline Review (IBR)
May 2021	Exercised the option for the second ship, FFG 63
June 2021	Build Specification Certified by NAVSEA 05
August 2021	Build Specification integrated into the contract via no cost contract modification
September 2021	Executed FFG (62) Integrated Baseline Review (IBR)

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## Schedule

### Schedule Events

Schedule Events					
Events	Development APB Objective	Current APB Development Objective/Threshold		Current Estimate/Actual	Deviation
Milestone B	April 2020	April 2020	April 2020	April 2020	
Detail Design and Construction Contract Award	Jul 2020	Jul 2020	Jan 2021	April 2020	
Critical Design Review	Jun 2022	June 2022	Dec 2022	May 2022	
Lead Ship Delivery	Sep 2026	Sep 2026	Mar 2027	Sep 2026	
West Coast training and support facilities occupancy date	Sep 2028	Sep 2028	Mar 2029	Sep 2028	
IOT&E Complete	Sep 2029	Sep 2029	Sep 2030	Sep 2029	
Initial Operational Capability	Sep 2029	Sep 2029	Sep 2030	Sep 2029	
Full Operational Capability	Mar 2031	Mar 2031	Mar 2032	Mar 2031	

#### Schedule Notes:

- All west coast training and support facilities are fully operational by FOC to support FFG(62) Blue and Gold Crewing.
- MDA specified Initial Operational Test & Evaluation (IOT&E), Initial Operational Capability (IOC), and Full Operational Capability (FOC) schedule thresholds at 12 months after objective at Milestone B.

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## Performance

Performance Characteristics				
Development APB Objective	Current APB Development Objective/Threshold	Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	Deviation
<b>Cyber Survivability</b>				
(T=O) FFG(X) shall be designed in accordance with tailored Cyber Survivability Attributes for cyber resiliency by considering and implementing best practices for cyber defense in accordance with the Information Assurance Technical Authority Defense-in-Depth Functional Implementation Architecture Standard.	(T=O) FFG(X) shall be designed in accordance with tailored Cyber Survivability Attributes for cyber resiliency by considering and implementing best practices for cyber defense in accordance with the Information Assurance Technical Authority Defense-in-Depth Functional Implementation Architecture Standard.	(T=O) FFG(X) shall be designed in accordance with tailored Cyber Survivability Attributes for cyber resiliency by considering and implementing best practices for cyber defense in accordance with the Information Assurance Technical Authority Defense-in-Depth Functional Implementation Architecture Standard.	(T=O) FFG(X) shall be designed in accordance with tailored Cyber Survivability Attributes for cyber resiliency by considering and implementing best practices for cyber defense in accordance with the Information Assurance Technical Authority Defense-in-Depth Functional Implementation Architecture Standard.	N/A
<b>Sustainment</b>				
(T=O) FFG(X)s shall maintain their Material Availability, Operational Availability, and Reliability Threshold values in order to support the Blue/Gold crewing and deployment model delivering at least a 0.5 presence forward.	(T=O) FFG(X)s shall maintain their Material Availability, Operational Availability, and Reliability Threshold values in order to support the Blue/Gold crewing and deployment model delivering at least a 0.5 presence forward.	(T=O) FFG(X)s shall maintain their Material Availability, Operational Availability, and Reliability Threshold values in order to support the Blue/Gold crewing and deployment model delivering at least a 0.5 presence forward.	(T=O) FFG(X)s shall maintain their Material Availability, Operational Availability, and Reliability Threshold values in order to support the Blue/Gold crewing and deployment model delivering at least a 0.5 presence forward.	N/A
<b>Materiel Availability</b>				
At least 0.56	At least 0.56	At least 0.46	At least 0.56	N/A
<b>Operational Availability</b>				
At least 0.87	At least 0.87	At least 0.72	At least 0.87	N/A
<b>Net Ready</b>				
(T=O) FFG(X) shall support net centric military	(T=O) FFG(X) shall support net centric	(T=O) FFG(X) shall support net centric military operations.	(T=O) FFG(X) shall support net centric	N/A

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Performance Characteristics				
Development APB Objective	Current APB Development Objective/Threshold	Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	Deviation
operations. FFG(X)'s systems shall be able to enter and be managed in the network, and exchange data in a secure manner to enhance mission effectiveness. These systems must continuously provide interoperable, secure, and operationally effective information exchanges to enable a net centric military capability.	military operations. FFG(X)'s systems shall be able to enter and be managed in the network, and exchange data in a secure manner to enhance mission effectiveness. These systems must continuously provide interoperable, secure, and operationally effective information exchanges to enable a net centric military capability.	FFG(X)'s systems shall be able to enter and be managed in the network, and exchange data in a secure manner to enhance mission effectiveness. These systems must continuously provide interoperable, secure, and operationally effective information exchanges to enable a net centric military capability.	military operations. FFG(X)'s systems shall be able to enter and be managed in the network, and exchange data in a secure manner to enhance mission effectiveness. These systems must continuously provide interoperable, secure, and operationally effective information exchanges to enable a net centric military capability.	
<b>Training</b>				
(T=O) FFG(X) crew shall be able to achieve Qualification and Certification in an off-ship training environment shall be used to the fullest extent in accordance with current SFTRM and TYCOM training guidance for Basic, Advanced, and Integrated Phase Training certification to support Blue and Gold rotational crewing.	(T=O) FFG(X) crew shall be able to achieve Qualification and Certification in an off-ship training environment shall be used to the fullest extent in accordance with current SFTRM and TYCOM training guidance for Basic, Advanced, and Integrated Phase Training certification to support Blue and Gold rotational crewing.	(T=O) FFG(X) crew shall be able to achieve Qualification and Certification in an off-ship training environment shall be used to the fullest extent in accordance with current SFTRM and TYCOM training guidance for Basic, Advanced, and Integrated Phase Training certification to support Blue and Gold rotational crewing.	(T=O) FFG(X) crew shall be able to achieve Qualification and Certification in an off-ship training environment shall be used to the fullest extent in accordance with current SFTRM and TYCOM training guidance for Basic, Advanced, and Integrated Phase Training certification to support Blue and Gold rotational crewing.	N/A
<b>Energy</b>				
6000nm at 16kts	6000nm at 16kts	4000nm at 16kts	6000nm at 16kts	N/A
<b>Average Follow Cost (average SCN end cost across a 20 ship program (ships 2-20))</b>				
\$832M (CY20\$)	\$832M (CY20\$)	\$987M (CY20\$)	\$812M (CY20\$)	N/A

Requirements Source: Guided Missile Frigate (FFG(X)) CDD dated February 11, 2019

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## Acquisition Budget Estimate

### Total Acquisition Cost

Category	Base Year	Development APB	APB Name (Current) (04/09/2020)		Budget Estimate PB 2023		Deviation
		Objective (BY\$)	Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$	
RDT&E	2020	1151.2	1151.2	1266.3	1126.8	1278.8	24.4
Procurement	2020	19003.0	19003.0	20903.3	18874.7	21421.7	128.3
MILCON	2020	685.4	685.4	753.9	750.3	851.5	(64.9)
Acq. O&M							
<b>Total</b>							
PAUC	2020	1041.98	1041.98	1146.18	1037.58	1177.60	4.40
APUC	2020	950.15	950.15	1045.17	943.73	1071.09	6.42

### Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	0	0
Procurement	20	20

#### Budget Notes:

The December 2021 SAR is aligned with the PB 2023 budget submission.

SCN Program Office Estimate (POE) includes \$322.1M Land Based Engineering Site (LBES) cost estimate

CAPE Cost Risks: Program risks are identified in the Risk and Sensitivity Analysis section.

Values in the APB are based on the Guided Missile Frigate, FFG (62) Component Independent Cost Estimate (C-ICE) of April 15, 2020.

Procurement values include End Cost for procurement of 20 ships, and Outfitting & Post Delivery MILCON includes funding for the facilitization to support FFG (62) training requirements.

O&S Cost includes unit level manpower, unit operations, maintenance, sustaining support, indirect support costs, and disposal costs.

#### Cost Deviations Explanations:

Under Procurement category we are accounting for an SCN Program Office Estimate (POE) of \$322.1M Land Based Engineering Site (LBES) cost estimate. LBES is not included in the FFG APB.

### Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Procurement Cost (December 2021)	
1.	The December 2021 SAR is aligned with the PB 2023 budget submission.

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2.	Current Baseline Estimate is the same as the Original Baseline Estimate.
<b>Original Baseline Estimate (April 2020)</b>	
1.	The Component Independent Cost Estimate (C-ICE), dated April 15, 2020, reflects risk-adjusted estimates for End Cost and point estimates for all other cost areas. The risk and sensitivity analysis is detailed in the C-ICE.

## Unit Cost

### *Current Baseline Compared with Current Estimate*

Category (\$M)	Current APB	Current Estimate	% Change	NMC Breach
<b>PAUC</b>				
Cost	20839.6	20751.7	-	-
Quantity	20	20	-	-
Unit Cost	1041.98	1037.58	-.4%	No
<b>APUC</b>				
Cost	19003.0	18874.7	-	-
Quantity	20	20	-	-
Unit Cost	950.15	943.73	-.7%	No

### *Original Baseline Compared with Current Estimate*

Category (\$M)	Current APB	Current Estimate	% Change	NMC Breach
<b>PAUC</b>				
Cost	20839.6	20751.7	-	-
Quantity	20	20	-	-
Unit Cost	1041.98	1037.58	-.4%	No
<b>APUC</b>				
Cost	19003.0	18874.7	-	-
Quantity	20	20	-	-
Unit Cost	950.15	943.73	-.7%	No

## Contracts

Contract Data (\$TYM)		
Contract Number	N0002420C2300	
Effort Number	FFG-62 (Hull 1)	
Modification Number		
Award Date	April 30, 2020	
Definitization Date	April 30, 2020	
Order Number		
CAGE Code/CAGE Legal Name		
Contract Title	Guided Missile Frigate Detail Design and Construction (DD&C)	
Contract Address	1600 Ely Street, Marinette WI 54143	
Contracts/Effort Price, Quantity, and Performance (\$M)		
Initial Target Price \$794.4M	Current Target Price \$794.4M	
Initial Ceiling Price \$836.5M	Current Ceiling Price \$836.5M	
Contract's EAC \$834.41M	PM's EAC \$834.2M	
Initial Quantity 1	Current Quantity 1	Delivered Quantity
BAC \$695.42M	BCWP \$152.76M	ACWP \$168.76M
BCWS \$208.77M	Cost Variance \$16.00M	Schedule Variance \$56.01M

### Contract Notes:

Current cumulative SPI value is 0.73. Majority of schedule variance is attributed to issues with FMM subcontractor management: 1) Inability to flow down proper requirements resulting in stop work orders and delays in progress. 2) Inability to provide complete Vendor Furnished Information (VFI) to subcontractors to allow them to complete their work. 3) Late task starts due to purchase order negotiations taking longer than planned. Current cumulative CPI is 0.91. Current CPI is attributed to a few factors: 1) FMM rate/usage variances. 2) Realization of redirected FAF topside work.

Contract Data (\$TYM)		
Contract Number	N0002420C2300	
Effort Number	FFG-63 (Hull 2)	
Modification Number	P0005	
Award Date	May 20, 2021	
Definitization Date	May 20, 2021	
Order Number		
CAGE Code/CAGE Legal Name		
Contract Title	Guided Missile Frigate Detail Design and Construction (DD&C)	
Contract Address	1600 Ely Street, Marinette, WI 54143	
Contracts/Effort Price, Quantity, and Performance (\$M)		
Initial Target Price: \$553,315,747	Current Target Price \$553,315,747	
Initial Ceiling Price: \$582,634,127	Current Ceiling Price \$582,634,127	

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Contract's EAC: TBD		PM's EAC: TBD
Initial Quantity: 1	Current Quantity:1	Delivered Quantity
BAC	BCWP	ACWP
BCWS	Cost Variance	Schedule Variance

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## Technologies and Systems Engineering

### *Significant Technical Risks*

Significant Technical Risks	
Current Estimate (December 2021)	
1.	<p>FFG Test Dependencies Risk - If CRUDES AEGIS CP22-1, CP23-1(TBR) and DDG FLT III/BL 10.0 AW DT/OT events are not executed as projected per the FFG-62 TEMP leveraged plan, then additional FFG-62 AW DT/OT testing will be required to satisfy data needs to VV&amp;A the Combat System Test Bed (CSTB) model needed for IOT&amp;E /COTF Runs for Record (RfR).</p>
2.	<p>FMM DD&amp;C Staffing - If FMM cannot obtain and efficiently manage an ample skilled workforce to support the FFG 62 DD&amp;C contract efforts, it will result in immature deliverables, late CDRL submissions, increase rework, delays in contract milestones, cost increases and construction &amp; delivery delays of FFG 62 &amp; 63.</p>
3.	<p>GFE Platform Boundary Solution - If the PMW 130 GFE Platform Boundary design, integration and delivery does not occur in a timely fashion, then the FFG will face schedule delays and be unable to fulfill the boundary protection requirements contained in the CDD.</p>

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### Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	0.00%
Production	20	0	20	0.00%
Total Program Quantity Delivered	20	0	20	0.00%

#### Expended and Appropriated (TY \$M)

Total Acquisition Cost: \$25649.08  
 Expended to Date: \$815.8  
 Percent Expended: 3.2%  
 Total Funding Years: 22  
 Years Appropriated: 6  
 Percent Years Appropriated: 27.3%  
 Appropriated to Date: 4021.7  
 Percent Appropriated: 15.7%

The above data is current as of April 18, 2022.

#### Deliveries and Expenditures Notes:

Procurement Quantity to complete: 10  
 Total Program of Record Quantity: 20

## Operating and Support Costs

### Total Program O&S Cost Compared with Baseline

	Current APB Objective (BY\$)	Current APB Threshold (BY\$)	Current Estimate (BY\$)	Current Estimate (TY\$)	Deviation
Total O&S (\$Millions)	57928.1	63720.9	57928.1	96521.0	

### O&S Cost Breakdown:

Allocate O&S estimate by each weapon system (or system variants) acquired by the program into the CAPE Cost Categories. Add a fresh column for each variant/system.

Category (BY\$ Million)	FFG (62) Average Annual Cost Per Ship
Unit-Level Manpower	16.561
Unit Operations	5.397
Maintenance	9.848
Sustaining Support	10.686
Continued System Improvements	6.457
Other	8.979
Total O&S	57.928

**Cost Estimate Source:** Component ICE (April 15, 2020)

O&S Cost includes unit level manpower, unit operations, maintenance, sustaining support, indirect support costs, and disposal costs. The estimates are based on Guided Missile Frigate, (FFG (62)) Component Independent Cost Estimate (C-ICE) of April 15, 2020 supporting the FFG-62 Milestone B Review and APB. They are based on 20 ships in the class with an average service life of 25 years.

Disposal/Demilitarization Cost Estimate and Source of Estimate: \$179.6M  
 Disposal cost support the total program quantity of 20 ships. This estimate is from the O&S Life Cycle Cost Baseline date supporting the Program Milestone B certification. Disposal Cost is included in the O&S Cost of the current APB objective and threshold for this program \$385.8 M (TY) \$179.6M (CY 2020).

### Sustainment Strategy:

The program strategy to characterize and define measurable performance based targets within cost constraint(s) based on unique system and support functions necessary to meet the program sustainment KPP (engineering support, software support, training, maintenance and supply support). FFG (62) will leverage current fleet depot maintenance policies and procedures and existing depot repair infrastructure, including organic, defense industry (Naval Shipyards) and commercial capabilities to the maximum extent practicable.

### For Each Acquired System or System Variant:

- i. Quantity to Sustain: 20
  - ii. First Operational Fiscal Year: 2026
  - iii. Final Operational Fiscal Year: 2065
  - iv. Unit Expected Service Life: 25 years
- a. Antecedent System(s) O&S Costs: N/A

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