

SUPPLY CHAIN DIVISION GUIDE

2027 Digital Ship Challenge

Version 1.0 | September 2026



Guide Information

Version 1.0

This guide is subject to revision throughout the challenge season.

Any changes to this guide will be communicated through the official DSC Change Log found on the VDMC website (<https://digitalmaritime.org/digital-ship-challenge/>). Teams are responsible for reviewing the DSC Change Log and incorporating applicable updates.

Contact Information

If there are any questions regarding any aspect of the Digital Ship Challenge, please contact Jennifer Renne.
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Welcome to the 2027 Digital Ship Challenge

The Digital Ship Challenge provides students with authentic challenges that reflect the work, processes, collaboration, and problem-solving used by professionals in the maritime industry. Throughout the challenge season, your team will take on the role of industry professionals, applying technical knowledge, collaboration, creativity, and problem-solving to complete a real-world maritime challenge.

The Digital Ship Challenge follows the development of a professional project over time. Teams are expected to research, plan, develop, evaluate, document, and refine their work throughout the challenge season while completing a series of project checkpoints leading up to the final competition. Checkpoints are scored and contribute to the team's overall competition score, recognizing consistent progress and engagement throughout the challenge season.

This Division Guide serves as your primary reference throughout the season. We encourage your team to review this guide regularly, stay informed with the DSC Change Log, and document your process throughout the challenge.

We look forward to seeing the innovative solutions your team develops and wish you the best throughout the 2027 Digital Ship Challenge.

About This Guide

Throughout this guide you'll find information to help your team successfully complete the challenge, including:

- Competition overview and important dates
- Checkpoints
- Documentation Expectations
- Challenge Requirements
- Competition Procedures
- Judging Information
- Additional Resources

Before You Continue

The Division Brief introduced your team's mission, professional role, and the real-world context behind this year's challenge.

This Division Guide builds on that foundation by providing the information you'll use to successfully complete the challenge.

We recommend keeping both documents available as you work through the challenge.

In the Supply Chain Division, your team will take on the role of a maritime supply chain team. Maritime supply chain professionals coordinate the materials, resources, transportation, and schedules needed to keep shipyard operations moving efficiently. Throughout the challenge season, your team will apply the DMAIC process as you analyze information, develop a supply chain plan, evaluate risks, and make informed decisions in response to changing operational conditions.



1. Challenge Season Overview

1.1 Challenge Timeline

Milestone	Date	Description
Final Team Registration	September 30, 2026	This includes the team's name, all student names, and email addresses (for Google Drive sharing purposes only)
Checkpoints	Ongoing through the challenge season	See Section 2 for more details
Withdrawal Date	November 30, 2026	This is the final date for teams to withdraw from the Digital Ship Challenge without impacting competition planning. Schools unable to continue should notify the Challenge Coordinators by this date.
Mid-Year Review	December 17, 2026, and December 18, 2026	The Mid-Year Review will be broken into 2 dates based on divisions. More information will be available in October.
Final Professional Poster Submission	March 1, 2027, by 5:00pm	Submitted on Google Drive using template provided within your team's folder to be printed by the DSC organizers
Competition Day Schedule	March 1, 2027	Will be emailed out to teachers/advisors and placed in the team's Google Drive Folders
Final Digital Notebook Submission	March 12, 2027, by 5:00pm	Submitted on Google Drive in the Final Digital Notebook folder within your team's folder.
Competition Day	March 18, 2027	The event will be held at Nauticus in downtown Norfolk. It will be open to the public.

Team Changes & Withdrawals

Teams are expected to maintain their registered team membership throughout the challenge season. The Digital Ship Challenge recognizes that circumstances may arise that require changes to team participation.

Team Member Changes: Any changes to registered team members must be communicated to the Digital Ship Challenge organizers by the team's teacher/advisor. Students may not independently switch teams or divisions. Requests to add, remove, replace, or transfer team members will be reviewed based on the timing of the request and applicable team requirements.

Division Changes: Teams wishing to change divisions must contact the Digital Ship Challenge organizers for approval. Division changes may be limited after challenge materials, mentors, standardized components, or other division-specific resources have been assigned.



Team Withdrawal: If a team is no longer able to participate in the Digital Ship Challenge, the teacher/advisor must notify the Digital Ship Challenge organizers by the published withdrawal deadline. Timely notification allows competition planning, mentor assignments, materials, schedules, and event logistics to be adjusted accordingly.

Changes requested after published deadlines may not be accommodated.

1.2 Team Expectations

Participation in the Digital Ship Challenge is intended to reflect the collaborative nature of today's maritime industry. Teams are expected to work together throughout the challenge season while demonstrating professionalism, effective communication, and steady progress toward completing the challenge.

Team Composition

- Teams must consist of 2-4 students
- Individual schools will determine how teams are selected
- Each team must have a teacher or advisor who serves as the primary point of contact throughout the challenge season
- Students may participate in one Digital Ship Challenge team during the challenge season
- Students may compete in only one division

School Participation

- Schools may register multiple teams
- Schools may participate in multiple divisions
- There is currently no limit to the number of teams a school may register within a division

Team Commitment

The Digital Ship Challenge is designed as a season-long experience that mirrors the development of professional maritime projects. Teams are expected to remain actively engaged throughout the challenge season and complete all required Checkpoints and other required challenge deadlines.

Throughout the challenge season, teams are expected to:

- Participate actively throughout the challenge
- Complete all required Checkpoints as stated
- Maintain accurate division documentation
- Monitor the DSC Change Log and incorporate applicable updates
- Demonstrate professionalism in all communications and presentations
- Follow all competition rules and safety requirements

Student Work & Outside Assistance

Teams may seek guidance, feedback, instruction, and technical advice from teachers, advisors, mentors, industry professionals, and other resources throughout the challenge season. However, all competition deliverables and evaluated work must be completed by registered student team members. Outside assistance should support student learning and decision-making, not complete the work on behalf of the team.

Artificial Intelligence (AI)

Artificial intelligence (AI) tools may be used to support learning, brainstorming, proofreading, or formatting when permitted by the team's teacher or advisor. However, AI may not be used to generate the team's design,



documentation, software, presentation, or other competition deliverables. All submitted work must accurately reflect the team's own thinking, decision-making, and original work.

Safety

Safety is a shared responsibility throughout the Digital Ship Challenge. Teams are expected to follow appropriate safety practices during development, construction, testing, transportation, and Competition Day. Tools, materials, equipment, and technology should be used with appropriate supervision and in accordance with school policies, manufacturer guidance, and all published challenge requirements.

1.3 Industry Mentors

Throughout the Digital Ship Challenge, teams will have the opportunity to work with an industry mentor. Mentors are maritime professionals who can provide guidance, feedback, and an industry perspective as your team works through the challenge.

Your mentor is a resource for your team, not a member of the team completing the challenge for you. The purpose of mentorship is to help you think through problems, ask questions, consider different approaches, and learn more about how similar challenges are approached in the maritime industry.

Your Mentor May:

- Ask questions that help your team think through ideas and decisions
- Provide feedback on designs, plans, testing, and challenge progress
- Share relevant professional experiences, industry practices, and career pathways
- Suggest topics, tools, processes, or resources for your team to research
- Help your team identify potential problems or considerations you may have overlooked

Your Mentor Should Not:

- Design or build your team's solution
- Complete calculations, drawings, code, documentation, or other deliverables for the team
- Make project decisions for your team
- Complete work that will be submitted or evaluated as part of the competition

Remember: Your mentor may not have expertise specific to every aspect of your challenge, and that is okay. Mentors bring valuable professional experience, problem-solving skills, and knowledge of the maritime industry. Your team is responsible for asking questions, seeking feedback, and making the most of the mentorship experience.

Make the most of your mentor meetings. Come prepared with an update on your team's progress, questions you would like to discuss, and specific areas where you would like feedback. Your mentor meetings are most valuable when your team is prepared to lead the conversation.

1.4 Communication & DSC Change Log

Official Communication

All official announcements will be communicated through the Digital Ship Challenge website or emailed to the team's teacher or advisor.

Teachers and advisors are responsible for sharing important updates with their teams and ensuring students remain informed throughout the challenge season.



Questions regarding the challenge should be directed to the Digital Ship Challenge organizer using the contact information provided on page two of this guide or on the Digital Ship Challenge website.

DSC Change Log

The Division Guide may be updated throughout the challenge season to clarify requirements, correct errors, or communicate important changes. This will be done through the DSC Change Log.

Teams are responsible for reviewing the DSC Change Log and ensuring that they are using the most current version of the Division Guide throughout the season. We recommend checking for updates prior to each Checkpoint and before Competition Day.

When updates are made:

- The DSC Change Log will be updated describing the change
- The revised Division Guide will be posted on the Digital Ship Challenge website

2. Checkpoints

The Digital Ship Challenge is designed as a season-long experience that encourages teams to make consistent progress throughout the challenge season. Rather than completing the challenge just before Competition Day, teams will complete a series of checkpoints that document their work, decision-making, and demonstrate progress toward the final competition.

Each checkpoint focuses on a different stage of the project and contributes to the team's overall competition score. While the specific checkpoint requirements vary by division, all teams are expected to submit their work by the published deadlines.

Partial points are not awarded for checkpoints. If a submission does not meet the required checkpoint criteria or is not submitted by the published deadline, the team will not receive points for that checkpoint.

2.1 Submission Process

All checkpoint requirements should be documented within the team's Digital Notebook. Teams will maintain one continuous Digital Notebook throughout the challenge season and update it to reflect the work required for each checkpoint. The Digital Notebook must be accessible through the team's designated Google Drive folder by each published checkpoint deadline. See Section 4: Digital Notebook for additional requirements and guidance.

Each submission should accurately reflect the team's progress at that stage of the challenge season. Organizers may review documentation, revision history, and supporting materials as part of the evaluation process to verify continued progress throughout the season.

2.2 Evaluation

Checkpoints are evaluated to measure each team's progress throughout the season rather than the completeness of their final solution.

Evaluators will review each submission using the criteria outlined for that checkpoint and determine whether the team has demonstrated appropriate progress for that stage of the project. Teams may also receive feedback if evaluators identify major concerns.

Following each checkpoint evaluation, updated team scores will be shared in the team's Google Drive so teams can monitor their progress.



2.3 Checkpoint Timeline

Checkpoint Date and Time	What needs to be submitted	Points
Review Challenge and Overview of Digital Notebook October 7, 2026 11:59pm	Initial section of the digital notebook including: - Title Page with team name and school - Table of contents page - Challenge Interpretation and problem summary - Preliminary team roles and schedule (this includes selecting your position at the shipyard) Team mentor/teacher should confirm student understanding of challenge and constraints	10
Research and Mapping November 4, 2026 11:59pm	Notebook Updates - Research Notes - Completed initial supply chain map, supplier tiers, material/information/payment flows, lead times/capacities	10
Mid-Year Review December 17/18, 2026 Time TBD	In-person attendance at the mid-year workshop. Bring to the event: - Supply Chain map - Talking points/questions for division Q & A and Maritime Connect (see section 2.4 for more detailed information)	25
Production Plan January 13, 2027 11:59pm	Notebook Updates - Supplier selections - Quantities, costs - Material arrival dates - Production Schedule - Project delivery date - Initial total cost	20
Risk Analysis February 3, 2027 11:59pm	Notebook Updates - Potential risks - Impacts - Possible mitigation strategies - Role perspectives	20
Scenario Analysis & Decision-Making February 24, 2027 11:59pm	Notebook Updates - Complete a practice supply chain disruption scenario - Identify how the disruption affects the team's supply chain - Document the team's reasoning and the roles involved in the decision	10
Presentation Preparation March 10, 2027	Presentation outline submitted Prepare for your oral presentation (7-10 minutes)	10



11:59pm	• Must include information from notebook, including your supply chain map, production plan, risk analysis, and application of DMAIC process • Highlight important findings, decisions, and lessons learned throughout the challenge season • Practice answering judging questions	
Professional Poster Submission March 1, 2027 5:00pm	Online submission of the Professional Poster for printing	10
Digital Notebook Submission March 12, 2027 5:00 pm	Online submission of Digital Notebook	10
Digital Ship Challenge March 18, 2027 Time TBD	In person event at Nauticus	N/A

2.4 Mid-Year Review

The Mid-Year Review provides teams with an opportunity to ask questions, clarify challenge requirements, and connect directly with maritime industry professionals midway through the challenge season. The event is designed to help teams strengthen their understanding of the challenge and gain industry perspective as they continue their work.

During the Mid-Year Review, teams will participate in two activities:

Division Question & Answer Session

Teams will participate in a division-specific question and answer session focused on the challenge, technical requirements, and other division-related topics. Teams should review their progress and challenge materials prior to the event and arrive prepared with questions they would like addressed.

Maritime Connect

Teams will interact with industry partners connected to their division to learn more about the maritime industry careers, organizations, and the real-world work related to their challenge. Students should come prepared with questions for industry partners and be ready to engage in professional conversations.

Teams are expected to arrive prepared with questions for both the Division Question & Answer Session and Maritime Connect. Additional event schedules and participation details will be provided prior to the Mid-Year Review.



3. Professional Approach

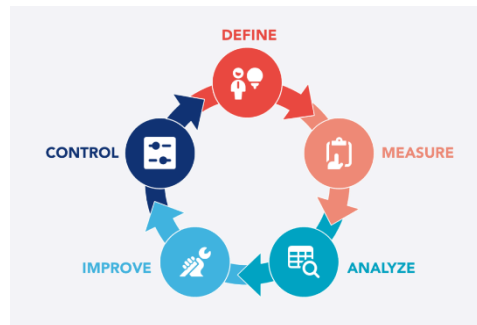
Every profession has its own way of approaching complex challenges. While the tools, responsibilities, and day-to-day tasks may differ, successful professionals rely on structured approaches to organize their work, collaborate effectively, evaluate information, and continuously improve their solutions.

Throughout the Digital Ship Challenge, your team is encouraged to adopt the same mindset. The professional approach presented in this section reflects common practices used and is intended to guide your team's planning, decision-making, and progress throughout the season.

While there is no single “right” way to complete the challenge, following a structured professional approach will help your team stay organized, make informed decisions, and build the knowledge and understanding needed to respond effectively on Competition Day.

3.1 DMAIC Process

The DMAIC (Define, Measure, Analyze, Improve, Control) process is a structured problem-solving approach used by operations, logistics, and business professionals to improve processes, increase efficiency, and solve complex operational challenges. Rather than relying on assumptions or a single solution, professionals follow a structured, data-driven process of defining the problem, measuring performance, analyzing information, implementing improvements, and controlling results to achieve sustainable outcomes.



While every organization may adapt the process to meet its specific needs, the fundamental principles remain the same. Throughout the Supply Chain Division, your team is encouraged to use the DMAIC process to guide decisions, document progress, evaluate information, and develop a deeper understanding of the operational systems that make up the supply chain.

3.2 Applying the DMAIC Process

The DMAIC process provides a structured framework for understanding complex operations, analyzing information, developing data-driven metrics, and continuously improving performance. Throughout the Digital Ship Challenge, your team should apply each phase of the DMAIC process as you research the supply chain, evaluate operational data, develop visual representations, and prepare to respond to changing conditions. While teams may revisit earlier phases as new information becomes available, each phase plays an important role in developing informed, effective operational decisions.



DMAIC Process	Application to the Supply Chain Division
Define	Define the operational challenge by understanding the end-to-end supply chain, identifying stakeholders, mapping the movement of materials and information, and establishing the project's objectives.
Measure	Gather and organize information about the supply chain using research, process maps, graphs, diagrams, performance metrics, and other visual tools that help explain how the system operates.
Analyze	Evaluate the information collected to identify risks, constraints, bottlenecks, dependencies, and opportunities for improvement.
Improve	Develop and evaluate potential strategies that could improve operational performance, reduce the impact of disruptions, and support informed decision-making.
Control	Evaluate how operational changes may affect system performance, document key findings, and identify opportunities for continuous improvement and future decision-making.

Real-world supply chains are constantly changing. Successful professionals must analyze new information, respond to unexpected challenges, and make informed decisions under changing conditions. Throughout the Digital Ship Challenge, use the DMAIC process to guide your thinking, communicate your findings, and prepare to respond as new information becomes available.

4. Digital Notebook

Throughout the challenge season, your team will maintain a Digital Notebook using Google Slides that documents the development of your work from your initial understanding of the challenge through your final preparation for Competition Day.

Your Digital Notebook should demonstrate how your team researched, organized information, analyzed operations, evaluated potential strategies, and improved its understanding throughout the challenge season, not simply what you completed. It should provide judges with a clear understanding of your team's process, the decisions your team made, and how your thinking developed as you applied the DMAIC process throughout the challenge season.

A strong Digital Notebook is:

- **Accurate:** represents your team's work and decision-making throughout the season
- **Organized:** uses clear section headings, logical organization, and consistent formatting
- **Complete:** includes the information needed to understand your team's process, analysis, decisions, and progress throughout the challenge season
- **Evidence-Based:** supports findings and decisions with research, data, calculations, analysis, observations, and other relevant evidence
- **Professional:** communicates ideas clearly using appropriate sketches, drawings, photographs, videos, tables, and diagrams

Your Digital Notebook is a living document and should be updated throughout the challenge season. Teams will use one continuous Google Slides Presentation for their Digital Notebook throughout the challenge season.



Checkpoint requirements should be completed and documented within the Digital Notebook, which will serve as the primary evidence reviewed during each Checkpoint and will also support final judging. See Section 2: Checkpoints for specific Checkpoint requirements, deadlines, and evaluation procedures.

4.1 Recommended Digital Notebook Organization

Your Digital Notebook should tell a story, from your initial understanding of the challenge through the research, analysis, evaluation, and preparation completed throughout the challenge season. A clear and organized Digital Notebook makes it easier to communicate how your team applied the DMAIC process, developed an understanding of the supply chain, evaluated operational information, and prepared to make informed decisions under changing conditions. While teams have flexibility in how they organized their Digital Notebook, the following structure is recommended to help ensure all major aspects of the project are documented in a logical and professional manner.

Section	Purpose
Title Page	Digital Ship Challenge 2027, Division Name, Team Name, School, Teacher/Advisor, Team Members
Table of Contents	Organized navigation for the notebook
Challenge Interpretation & Define	Your team's understanding of the challenge, how the supply chain works, who is involved, and the goals or problems your team is exploring
Project Planning	Team roles, project schedule, milestones, meeting notes, responsibilities, and planning documents
Research & Measure	Research and information used to understand how the supply chain operates, including process maps, data, industry practices, and other supporting information
Operational Analysis	Application of the Analyze phase to identify and evaluate relationships, risks, constraints bottlenecks, dependencies, and other factors that may affect operations
Strategies & Improve	Potential strategies or approaches considered in response to operational challenges, including comparisons, trade-offs, supporting evidence, and reasoning
Evaluation & Control	Evaluation of how operational changes or proposed strategies may affect performance, lessons learned, key findings, and considerations for continued or future decision-making
Competition Preparation	Practice scenarios, operational decision-making exercises, lessons learned, and evidence of preparation to analyze and respond to changing conditions on Competition Day
Final Project Summary	Summary of the team's understanding of the operational system, major findings, key decisions, and how the DMAIC process informed the team's work throughout the challenge season
Appendix	References, supporting data, supplemental charts or diagrams, linked files, and other supporting documentation



4.2 Supporting Evidence

Your Digital Notebook should include supporting evidence that helps communicate your team's work. Examples include but are not limited to:

- Research notes and sources
- Supply chain or process map
- Charts, graphs, and tables
- Data and calculations
- Diagrams and flowcharts
- Notes about problems, risks, or bottlenecks identified
- Comparisons of different strategies or approaches
- Practice scenarios and team responses
- Notes explaining team decisions and reasoning
- Meeting notes
- Project schedules
- Screenshots, photographs, or videos when appropriate

Supporting evidence should demonstrate how your team used information to understand operations, evaluate conditions, make decisions, and improve its approach, rather than simply documenting completed activities. Teams are not expected to include every type of evidence listed above; evidence should be included when it helps demonstrate your team's understanding, analysis, decisions, or progress.

4.3 Submission Requirements

The Digital Notebook serves as the official record of your team's work throughout the challenge season. Teams are responsible for maintaining their Digital Notebook, ensuring it is accessible throughout the season and submitting it by the published deadline.

- The Digital Notebook must be created using Google Slides.
- Each team will be provided with a dedicated Google Drive folder for maintaining their Digital Notebook and any supporting files throughout the challenge season.
- The Digital Notebook should be maintained as one continuous document throughout the challenge season rather than creating a new Digital Notebook for each checkpoint.
- Teams are encouraged to update their Digital Notebook regularly as work is completed rather than waiting until checkpoint deadlines or final notebook submission.
- The Digital Notebook must remain accessible in the Google Drive folder to the Digital Ship Challenge organizers throughout the challenge season.
- Teams are responsible for ensuring that all linked files, videos, and supporting documents have the appropriate sharing permissions prior to submission.
- The final Digital Notebook must be submitted by the deadline listed in the challenge timeline.
- Any external resources used to support the challenge, including research, reference materials, images, or other published content, must be properly cited.

The Digital Notebook is expected to reflect continuous work throughout the challenge season. Digital Ship Challenge organizers may review document revision history and other available version history tools as part of the checkpoint evaluation process to verify ongoing project development.



The Digital Ship Challenge is a student-centered competition. All work submitted throughout the challenge season must be completed by the student team. Teachers, mentors, parents, and other supporters may coach, encourage, and provide guidance throughout the challenge season, but the ideas, decisions, documentation, and final deliverables must be created by the student team.

Student teams are expected to:

- Develop and document their own ideas and solutions
- Conduct their own research, testing, and analysis
- Create their own design documentation, presentations, and competition materials
- Accurately represents the work completed by the team throughout the challenge season

5. Professional Poster and Team Presentation

Communicating information clearly and professionally is an essential skill across the maritime industry. Maritime professionals regularly present their work to clients, project managers, leadership teams, stakeholders, and colleagues to explain their approach, share findings and results, and support decisions and recommendations.

As part of the Digital Ship Challenge, each team will develop a professional-style poster and deliver a professional presentation summarizing their work throughout the challenge season. Together, these components should communicate the team's approach to the challenge, key decisions, supporting evidence, findings, and progress throughout the challenge season.

5.1 Professional Poster

Each team will create a professional poster that visually communicates its work and findings throughout the challenge season. The poster should summarize the team's work in a clear, organized, and engaging format while highlighting the most important aspects of the project. The poster will serve as the primary visual aid during the team presentation and will be displayed throughout the Competition Day.

A successful poster should:

- Clearly communicate your team's approach, progress, and key findings throughout the challenge season
- Highlight the process used throughout the division challenge
- Present information in a logical and visually organized manner
- Include graphics, photographs, diagrams, and data that support your work
- Be readable from several feet away using concise text and effective visuals
- Demonstrate professionalism through consistent formatting and visual design

To promote consistency while allowing for creativity, an official professional poster template will be provided in each team's Google Drive folder. The template will include recommended content sections, formatting guidance, technical specifications, and design best practices to support the development of a professional-quality poster. Each team must submit a digital copy of their professional poster by the published deadline that follows the submission requirements. Posters will be professionally printed by the Digital Ship Challenge organizers and displayed throughout Competition Day. Posters should be carefully reviewed prior to submission, as revisions will not be accepted after the submission deadline.

5.2 Team Presentation

Communication is an essential skill across the maritime industry. Maritime professionals regularly present their work to clients, stakeholders, leadership teams, and colleagues to explain their approach, communicate findings and results, and support decisions and recommendations.



As part of the Digital Ship Challenge, each team will deliver a 7–10-minute professional presentation summarizing their work throughout the challenge season. Using their professional poster as the primary visual aid, teams should communicate their understanding of the challenge, approach, key decisions, supporting evidence, and results. Following each presentation, judges will have an opportunity to ask questions. Every team member should be prepared to participate in the team presentation.

Successful presentations should:

- Clearly explain the team’s understanding of the challenge
- Describe the professional process or approach used throughout the challenge
- Highlight key decisions and the reasoning behind them
- Use relevant evidence, data, research, or analysis to support the team’s work
- Communicate key findings, results, and progress throughout the challenge season
- Reflect on the contributions of all team members

Presentation Requirements:

- Presentation length must be 7-10 minutes
- The professional poster will serve as the primary visual aid
- All team members are expected to actively participate in the presentation
- Professional attire is encouraged

Each team will be assigned a presentation time and location for the Competition Day. The official presentation schedule will be distributed to teachers and advisors by the published deadline. Teams are responsible for arriving at their assigned presentation location on time and prepared to present.

6. Division Challenge Requirements

The Supply Chain Division challenges teams to manage the flow of materials, information, and costs associated with constructing a hull section at Monarch Shipyard. Throughout the challenge season, teams will develop an understanding of the supply chain, select suppliers, develop a production plan, identify potential risks, and prepare to respond to disruptions that may affect cost and schedule.

Teams should apply the DMAIC process described in Section 3 throughout their work. The information and requirements in this section establish the operational conditions teams will use throughout the challenge season and on Competition Day.

6.1 Your Role at Monarch Shipyard

Welcome to Monarch Shipyard, a fictional shipyard located in Norfolk, Virginia. Your team is responsible for helping manage the supply chain needed to support construction of a section of a vessel’s hull.

Each team member will select one of the following professional roles:

- Procurement Manager
- Logistics Manager
- Inventory Manager
- Operations Manager



After selecting roles, team members should research the responsibilities associated with their position and understand how each role contributes to the overall supply chain. Consider how the roles interact when making decisions involving suppliers, materials, transportation, inventory, production, cost, and schedule.

As you research your role, consider:

- How does your position support the overall supply chain?
- What does your position do to help ensure that critical parts and materials are available when needed?
- What decisions related to purchasing, cost, quantities, transportation, inventory, or scheduling may involve your position?
- How does your position interact with other positions on your team?

6.2 Monarch Shipyard Supply Chain

Your team is responsible for managing the supply chain needed to support construction of one section of a vessel's hull. For this challenge, the hull section requires the following materials:

Material	Required Quantity
High-Yield Strength Steel Plate	1,000 lb.
Antifouling Paint	5 gal.

All supplier costs provided in this section are landed costs, meaning customs, handling, and shipping costs required to deliver material to Monarch Shipyard are already included.

The target delivery date for the completed hull section is D90. The customer offers an early delivery incentive and applies a late delivery penalty based on the final delivery date.

Delivery Performance	Cost Impact
Earlier than D90	\$100 bonus for each day early
D90	No early delivery bonus or late delivery penalty
Later than D90	\$100 penalty for each day late

6.3 Supplier Information

Teams will use the following supplier information to map the supply chain, select suppliers, and develop their initial production plan.

High-Yield Strength Steel

Supplier	Upstream Sources	Cost	Availability	Transportation
Metals USA Langhorne, PA	Iron Ore: Minnesota Nickel: Indonesia Chromium: South Africa	\$20/lb.	Up to 250 lb. every 5 days	Truck to Monarch Shipyard
Wieland Metals East Longmeadow, MA	Iron Ore: Canada Nickel: Canada Chromium: Kazakhstan	\$25/lb.	Up to 250 lb. every 5 days by truck or up to 500 lb. every 15 days by barge	Truck or barge via Port of New York



Antifouling Paint

Supplier	Upstream Sources	Cost	Availability	Transportation
National Coatings Raleigh, NC	Copper: Chile; transported by container ship through the Port of Los Angeles	\$200/gal.	4 gal. in 5 days; remaining 1 gal. in an additional 5 days	Truck to Monarch Shipyard
Sherwin Williams Cleveland, OH	Copper-free paint	\$300/gal.	Up to 5 gal. in 5 days	Truck to Monarch Shipyard

6.4 Supply Chain Map

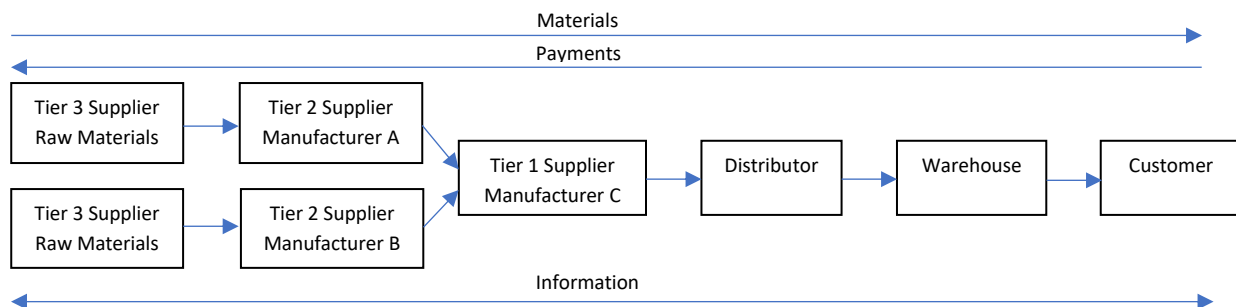
Before your team can manage the Monarch Shipyard supply chain, you must first understand how it works. Supply chain mapping is the process of documenting and visualizing how materials, information, and payments move through a supply chain.

Teams must create a visual map of the Monarch Shipyard supply chain. The map should identify, as applicable:

- Suppliers and supplier tiers
- Materials and their sources
- Transportation methods and routes
- Flow of materials
- Flow of information
- Flow of payments
- Supplier lead times
- Supplier capacities

The supply chain map should help your team understand where materials come from, how they reach Monarch shipyard, what information connects the organizations involved, and where potential risks or delays may occur.

An example of a simple diagram of a basic supply chain is below. Locations, lead times, and capacities would be needed to complete this diagram.





6.5 Production Planning

Once your team understands the supply chain, use the supplier information and operational requirements to select suppliers and develop an initial production plan for the hull section.

Operational Requirement	Value
Steel Required	1,000 lb.
Antifouling Paint Required	5 gal.
Fabrication Duration	25 days
Blasting & Coating Duration	10 days
Inventory Cost	\$100 per day
Labor Cost	\$2,500 per day
Target Delivery	D90

Use the following rules when developing your production plan:

- Fabrication may begin once all required steel has been received.
- Fabrication requires 25 days to complete.
- Blasting and coating may begin only after fabrication is complete and requires 10 days.
- Materials held in inventory before fabrication begins add \$100 per day in inventory cost, regardless of material or quantity.
- All inventory costs stop when fabrication begins.
- For consistency, all calculations use days and weekends count as workdays.
- Days should be identified as D1, D2, D3, and so on.
- Labor costs are averaged at \$2,500 per day and include wages, benefits, equipment, and overhead for the management and production workforce.
- Labor is charged from D1 through the day the completed hull section is delivered.

The initial production plan should document:

- Selected steel and paint supplier(s)
- Quantities ordered from each supplier
- Material costs
- Expected material arrival days
- Applicable inventory costs
- Fabrication start and completion days
- Blasting and coating start and completion days
- Projected delivery day
- Projected total cost
- Applicable early delivery bonus or late delivery penalty



An example of a simple production plan is below.

Production Plan										
Project Name	Sample									
Tasks	Start Day	End Day	Cost	D1	D2	D3	D4	D5	D6	D7
Order/Receive Material 1	D1	D3	\$100							
Order/Receive Material 2	D1	D5	\$200							
Store Material 1 (\$20/day)	D3	D5	\$60							
Assembly (\$100/day)	D5	D7	\$300							
Total Cost			\$660							

6.6 Supply Chain Risk Analysis

Modern supply chains can be affected by economic, geopolitical, environmental, workforce, transportation, cybersecurity, and other disruptions. Supply chain professionals identify potential risks before they occur and consider actions that could reduce their impact.

Using your supply chain map and production plan, identify potential risks that could affect the Monarch Shipyard supply chain. Consider how each risk could affect material availability, transportation, inventory, production, cost, or schedule.

For each risk considered, teams should document:

- The potential risk or disruption
- Which part of the supply chain could be affected
- The possible impact on cost and/or schedule
- Possible actions that could reduce or respond to the impact
- How the response may involve or affect the team's different professional roles

Teams are not expected to predict the specific Competition Day events. The purpose of risk analysis is to practice evaluating how different types of disruptions could affect the supply chain and to consider how professionals might respond.

6.7 Operational Rules & Assumptions

The following rules and assumptions apply throughout the challenge season and Competition Day:

- Supplier selections will be verified by judges before the first Competition Day event
- All material costs are landed costs
- Suppliers do not hold excess raw materials. Each new material order requires additional raw materials from the supplier's upstream suppliers
- Any new orders placed as a result of a Competition Day event will be processed on the same day as the event
- Materials stored before fabrication begins add \$100 per day in inventory cost, regardless of material or quantity. All inventory costs stop when fabrication begins
- Labor costs are averaged at \$2,500 per day and are charged from D1 through the day of delivery
- Any early delivery bonus will be subtracted from the team's total cost
- Any late delivery penalty will be added to the team's total cost
- If a Competition Day response requires a cost or delay that is not defined in the published challenge information, teams may request clarification from the Supply Chain Division judges



6.8 Demonstrated Performance Operational Challenge

Teams will arrive on Competition Day with their completed supply chain map and initial production plan showing selected suppliers, projected costs, and the projected delivery timeline. Supplier selections and initial calculations will be verified before the operational challenge begins.

Throughout Competition Day, teams will receive a series of operational events representing disruptions to the Monarch Shipyard supply chain. Events will be announced at specified times and displayed for a limited period. After each event, teams will have a set amount of time to evaluate the new information and record their response.

For each event, teams will:

- Determine whether the event affects their supply chain
- Identify the impact of the disruption
- Decide what mitigating action, if any, the team will take
- Calculate changes to total cost and projected delivery date
- Record the team's decision, reasoning, cost impact, and schedule impact on the Competition Day worksheet provided

Once the response period for an event has ended, teams may not revise their response to that event. Decisions made during earlier events remain part of the team's evolving supply chain and may affect later events.

Teams should use the DMAIC process to evaluate new information, analyze its impact, make informed decisions, and monitor how each decision affects the evolving supply chain.

Following the final event, Competition Day worksheets will be collected for judging.

Evaluation will consider:

- Accurate identification of disruptions affecting the team's supply chain
- Total cost
- Final delivery time
- The effectiveness and creativity of mitigating actions

Additional Competition Day information, including event schedules, team check-in procedures, venue maps, and other logistical details, will be provided prior to Competition Day.

7. Competition Readiness

Competition Day is the culmination of the Digital Ship Challenge season. Throughout the day, teams will participate in scheduled activities, including the Professional Poster & Team Presentation and the division-specific Demonstrated Performance.

Each team will receive a Competition Day schedule identifying their assigned times and locations. All teams are strongly encouraged to remain through the conclusion of the event and attend the Awards Ceremony. The ceremony is an important part of the Digital Ship Challenge experience, providing an opportunity to celebrate team accomplishments and recognize award recipients across all divisions.

Before arriving on Competition Day, teams should review the following checklist to ensure they have completed all required submissions, verified compliance with the technical specifications, and are fully prepared to participate. Take time to confirm each item before arriving to help prevent unnecessary issues during the competition.



Project Deliverables

- ☐ All required checkpoints have been submitted
- ☐ The Digital Notebook is complete and submitted by the published deadline
- ☐ The Professional Poster has been submitted by the published deadline
- ☐ The team presentation has been prepared and practiced for their presentation

Challenge Readiness

- ☐ Supply chain map is complete and available
- ☐ Initial production plan is complete
- ☐ Supplier selections have been finalized
- ☐ Initial cost and delivery calculations have been checked
- ☐ Team members understand their professional roles
- ☐ Team has practiced evaluating supply chain disruptions

Team Readiness

- ☐ All team members understand their presentation roles
- ☐ The team has reviewed the competition procedures
- ☐ The team has reviewed all published change log updates
- ☐ The team knows its assigned presentation and competition schedule

Teams are responsible for arriving on Competition Day prepared to compete. Failure to meet published deadlines, submit required materials, or comply with the challenge requirements will affect scoring. **Teams are encouraged to complete this checklist several days before the competition to allow time to address any outstanding items.**

8. Judging

The Digital Ship Challenge evaluates more than the final demonstrated performance. Judges consider each team's planning, project development, technical execution, communication, and professionalism throughout the competition. Successful teams demonstrate thoughtful preparation, effective teamwork, quality workmanship, and the ability to explain the decisions made throughout their project.

Teams will be evaluated on the following

Project Development	Evidence of research, planning, supply chain mapping, production planning, risk analysis, and application of DMAIC throughout the season
Operational Performance	Accuracy and effectiveness of the team's responses to Competition Day supply chain disruptions
Decision-Making & Analysis	How effectively the team evaluates information, considers impacts, and supports operational decisions with evidence and calculations
Professional Communication	The team's ability to clearly explain their process, decisions, findings, and results during the presentation and judge interview.



Professionalism	Teamwork, preparedness, organization, and respectful interaction with judges and event staff
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Detailed judging rubric for each competition component will be released at a later date and added to the Appendix of this guide. The release of the rubrics, along with any subsequent revisions, will be documented through the DSC Change Log.

Following the presentation and competition run, judges may ask questions to better understand the team's design process, technical decisions, testing, and overall project development. Teams should be prepared to explain how they approached the challenge, why they made key decisions, and how research, data, calculations, and analysis informed their work. Every team member should be prepared to participate in the discussion.

All judging decisions are final. Competition judges reserve the right to interpret competition rules and scoring procedures to ensure fair and consistent competition for all participants.

Successful teams typically:

- Demonstrate a clear and organized design process
- Use testing results to improve their design
- Support design decisions with evidence
- Communicate confidently and professionally
- Work effectively as a team
- Balance performance, innovation, and reliability

9. Appendix