

TECHNOLOGY 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
- Technical 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 Technology Division, your team will take on the role of a maritime technology team. Maritime technology professionals develop and use digital systems to collect, analyze, and communicate information that supports safe and efficient maritime operations. Throughout the challenge season, your team will apply the Software Development Process as you develop, test, and refine a digital system that analyzes operational data and identifies potential conflicts.



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.
Final Software Submission	March 12, 2027, by 5:00pm	Submitted as a ZIP file through the team's designated Google Drive 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) – Technology Division Exception



Artificial intelligence (AI) -assisted development tools, including AI coding assistants, are permitted in the Technology Division. AI-assisted tools are increasingly integrated into modern software development environments and workflows, and teams may use these tools to support their software development throughout the challenge season. Teams remain responsible for understanding and taking ownership of all software they submit. Judging will emphasize a team's understanding of how its system works. Teams should be prepared to explain their system architecture, describe how key components of their code function, justify technical decisions, and respond to questions about their development process. AI tools may support the development process, but they should not replace the team's understanding, decision-making, or ability to work with its own software.

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	10
Dataset Understanding & Research November 4, 2026 11:59pm	Notebook Updates: - Initial research into relevant port operations and terminology - Identification of potential operational issues that could be detected using the available data - Initial project plan and team responsibilities - Research on software packages/other systems	10
Mid-Year Review December 17/18, 2026 Time TBD	All Divisions: In-person attendance at the mid-year workshop. Bring to the event: - System Architecture Diagram - Design of team's data display - Talking points/questions for division Q & A and Maritime Connect (see section 2.4 for more detailed information)	25
System Design & Development January 13, 2027 11:59pm	Notebook Updates: - Initial event detection - Plan for communicating information and identified issues to the user - Early sketches, flowcharts, wireframes, pseudocode, system diagrams, or other planning documentation - Updates to project schedule and team responsibilities	20
System Development & Testing	Notebook Updates:	20



February 3, 2027 11:59pm	• Evidence of development, testing, debugging, and revisions • Visual Demonstration of software • Updated sketches, flowcharts, wireframes, pseudocode, system diagrams, or other planning documentation	
System Readiness February 24, 2027 11:59pm	Notebook Updates: • Evidence of system's ability to detect all issues • Clear communication of operational dataset with and without issues to the user • Evidence of testing and refinement based on results	
Professional Poster Submission March 1, 2027 5:00pm	Online submission of the Professional Poster for printing	10
Presentation Preparation March 10, 2027 11:59pm	Presentation outline submitted • Prepare for your oral presentation (7-10 minutes) • Must include information from notebook, including your system development process, system architecture and functionality, testing and refinement, and final system • Practice answering judging questions	10
Digital Notebook Submission March 12, 2027 5:00 pm	Online submission of Digital Notebook	10
Final Software Submission March 12, 2027 5:00pm	Online submission of Final Software	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

Professional software developers use structured development processes to organize complex projects, collaborate effectively, test their work, and deliver reliable software solutions. Throughout the Digital Ship Challenge, your team will use the Software Development Process to guide project planning, software development, testing, refinement, and communication.

Software development teams may use different methodologies depending on the organization and project. Regardless of the methodology used, professional development involves understanding requirements, planning and designing a system, developing and testing software, and evaluating its performance.

3.1 Software Development Process

Software development is the process of designing, developing, and delivering software applications through an organized series of steps. A structured development process helps teams understand user and system requirements, organize project work, design and develop software, test functionality, and improve the reliability and quality of the final product.

For the Digital Ship Challenge, teams will use the following Software Development Process as a framework throughout the challenge season:

1. Communication
2. Requirement Gathering
3. Feasibility Study
4. System Analysis
5. Software Design
6. Development
7. Testing
8. Integration
9. Implementation
10. Operation & Maintenance

Adapted from: GeeksforGeeks, “Software Development Process.” See References Pg. 23.



3.2 Applying the Software Development Process

The Software Development Process provides a structured framework for planning, developing, testing, and improving software solutions. Throughout the Digital Ship Challenge, your team should apply each phase of the process as you develop your software system. While software development is often iterative and teams may revisit earlier phases as their application evolves, each phase plays an important role in creating reliable, user-centered software that meets project requirements.

Software Development Process	Application to the Technology Division
Communication	Discuss the challenge as a team, identify questions that need to be answered, and develop a shared understanding of the problem the system is intended to address.
Requirement Gathering	Review the Division Brief, Division Guide, operational dataset, and other challenge materials to identify user needs, functional requirements, technical requirements, constraints, and expected system capabilities.
Feasibility Study	Research possible software tools, programming languages, libraries, platforms, and development approaches. Evaluate what is practical based on the challenge requirements, available resources, team skills, and project timeline.
System Analysis	Analyze the operational data, relationships, and conditions the system must evaluate. Determine the system's scope, major functions, information needs, and how the team will approach development.
Software Design	Plan how the system will function, how data will be imported and processed, how issues will be detected, and how information will be communicated to the user. Develop interface designs, flowcharts, system diagrams, or other planning documentation as appropriate.
Development	Develop the software by implementing the logic, features, data processing, and functionality needed to meet the challenge requirements.
Testing	Test system functionality using the operational data provided and team-developed test conditions. Identify errors, evaluate reliability and usability, and make improvements based on testing results.
Integration	Connect the individual components of the system and verify that data import, analysis, issue detection, user communication, and other functions operate together as intended.
Implementation	Prepare the completed system for use and verify that it can operate under the conditions required for the demonstrated performance, including local operation without internet connectivity.



Operation & Maintenance	Continue evaluating the system, correcting errors, refining functionality, and maintaining documentation as the team prepares for Competition Day.
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Successful software development is an iterative process that requires planning, collaboration, testing, and continuous improvement. Teams that regularly evaluate their work, incorporate feedback, and document their progress are better prepared to develop reliable software solutions and effectively communicate their work throughout the Digital Ship Challenge.

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 the development and refinement of your final system.

Your Digital Notebook should demonstrate how your team thought, planned, developed, tested or evaluated, and improved your solution, 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 system evolved 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 software development process and system development
- Evidence-Based: supports technical decisions with research, testing, observations, data, 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 development, testing, and refinement of your final system. A clear and organized Digital Notebook makes it easier to communicate your team's Software Development Process, technical decisions, testing, and improvements. 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 & Requirements	Your team's understanding of the challenge, user needs, system requirements, constraints, objectives, and



	questions identified during the Communication and Requirement Gathering phases
Research & Feasibility	Research into software tools, programming languages, libraries, platforms, existing technologies, and possible development approaches; evaluation of what is practical for the project
Project Planning & System Analysis	Team roles, project schedule, milestones, analysis of operational data and relationships, system scope, major functions, information needs, and development planning
Software Design	System architecture, data models and flows, logic flows, interface diagrams, wireframes, planned functionality, and key technical decisions
Development & Integration	Documentation of software development, implemented features and functionality, component development, integration, challenges encountered, and development progress
Testing & Refinement	Test cases and procedures, results, identified errors, troubleshooting, evaluation of reliability and usability, and improvements made based on testing
Implementation & System Readiness	Evidence that the completed system meets challenge requirements and operates under required conditions, and is prepared for Demonstrated Performance and Competition Day
Final System Summary	Overview of the completed system, its architecture and functionality, key technical decisions, and how it addresses the challenge requirements
Appendix	References, supporting files, linked photos or videos and other supplemental 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:

- System architecture diagram
- Diagrams such as data model, data flow, logic flow
- Screenshots of the system throughout development (with text explanations)
- UI wireframes
- Code samples or links to relevant code, when appropriate
- Research notes and source comparisons
- Software/tool/library comparisons
- Decision log
- Test cases
- Error, debugging, or troubleshooting documentation
- Charts and graphs
- Calculations
- Development or version history



- Videos (linked when appropriate)
- Meeting notes
- Project Schedules

Teams are not expected to include every type of evidence listed above. Supporting evidence should be included when it helps communicate the team's development process, technical decisions, testing, or system functionality.

4.3 Architecture Diagram

Each team is required to develop and maintain a system architecture diagram as part of its Digital Notebook. The architecture diagram should be updated as the team's system develops throughout the challenge season.

A system architecture diagram is a one-page visual representation of the major components of your software and how data moves between them. It is not a flowchart of your code, a UI mockup, or a list of features. Instead, it should demonstrate the structure of the system so that someone else can understand how the major components work together.

For the Technology Division, your diagram should show, at a minimum:

- How the operational data is imported into the system
- Where the data is held while the system runs (data model, database, in-memory)
- The component that evaluates the data and detects operational conflicts
- How results and identified issues are presented to the user
- Arrows showing how data flows between the system components
- The language, framework, or library used for each component

Teams may use any appropriate drawing tool to create the diagram, including Google Drawings, diagrams.net (Draw.io), Lucidchart, Google Slides, or a clearly labeled hand-drawn diagram.

4.4 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:

- Create their own technical documentation, presentations, and competition materials
- 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 the development of their solution 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, development process, and final system
- 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 technical 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, testing, 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 following division challenge requirements establish the functional requirements, technical specifications, competition constraints, and demonstrated performance procedures for the Technology Division. Teams are responsible for ensuring their system complies with all published requirements prior to Competition Day. Failure to meet these requirements may result in penalties or disqualification from portions of the competition.

Teams will be provided with a separate set of challenge resources to support the development and testing of their system. These resources include:

- Operational Dataset Data Dictionary
- JSON Schema
- Baseline Operational Dataset
- Port Operation Requirements



These materials should be used together with this Division Guide throughout the challenge season.

6.1 Functional Requirements

The system developed for the Technology Division must satisfy the following functional requirements. These requirements define the intended capabilities of the system and should be considered throughout the software development process. Teams have flexibility in how these capabilities are achieved unless otherwise specified.

Requirement	Description
Baseline Operational Dataset Import	The system must import and use the standardized operational dataset provided by the Digital Ship Challenge organizers as its source of port operations information.
Updated Operational Dataset Import	The system must be capable of importing updated operational dataset provided during the demonstrated performance without requiring internet access. The updated operational dataset will be provided on Competition Day via USB-C/USB-A.
Data Display	The system must allow judges to clearly view and understand the baseline operational data and updated operational data. Teams may determine how information is displayed and organized.
Updated Conditions	Once the updated operational dataset is imported, the system must reflect the updated operational conditions.
Dataset Evaluation	The system must evaluate the complete baseline operational dataset and updated operational dataset for all applicable issues. Teams should not assume that a dataset contains only one issue. A dataset may contain no issues, one issue, or multiple issues, and the system must continue evaluating the remaining data after an issue is identified. The system must communicate the results of its evaluation, including when no applicable issues are identified.
Issue Detection	The system must analyze the updated operational data and identify operational conflicts, inconsistencies, or other conditions that require attention. Issue detection must be performed by the system. Teams may not manually review the updated operational dataset to identify operational issues in place of system analysis.
Issue Communication	Identified issues must be clearly communicated to the user. The system must provide enough information for the user to understand what issue was identified, which data or operational activity is affected, and the condition contributing to the issue. The information provided should support the user in evaluating an appropriate operational response.
Reliability	The system must function locally and remain accessible during the demonstrated performance without relying on Wi-Fi or external internet connectivity.



Judge Questions & Software Comprehension	Judges may ask teams to explain system functionality, code logic, data handling, issue detection, and technical decisions. Teams may also be asked to interpret, troubleshoot, or make a limited modification to a portion of their software to demonstrate their understanding of the system they developed.
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6.2 Technical Specifications

The following technical specifications define the data, system, and standardized competition parameters for the Technology Division. All systems must comply with these specifications unless otherwise noted. Teams are encouraged to verify compliance throughout the software development and testing process.

Operational Dataset

Teams will receive a standardized operational dataset representing normal port operations. The baseline dataset will contain no intentional operational conflicts or errors and should be treated as the expected operating condition for the challenge.

The dataset may include information related to vessel arrivals, berth assignments, crane assignments, cargo movement, truck scheduling, and other operational activities identified in the challenge materials. This dataset will be provided in the team's designated challenge resources folder in Google Drive.

Updated Competition Dataset

During the demonstrated performance, teams will receive an updated version of the operational dataset containing changes to one or more operational conditions. Teams must be able to import the updated dataset into their system during the allotted time.

The updated dataset will use the same file format, data structure, and field organization as the baseline dataset unless otherwise specified.

Dataset File Format

The baseline and updated operational datasets will be provided using the same standardized file format. Teams must design their system to import and process the provided file format. All operational datasets will be provided as JSON (JavaScript Object Notation) files.

Dataset Documentation

Two documents are provided in Google Drive to help teams understand the structure and content of the operational dataset. Teams should use both documents when developing and testing their system.

JSON Schema

The JSON Schema defines how the operational dataset is structured, including the objects and fields contained within the dataset, required fields, data types, and permitted values where applicable. Teams should develop their system to import and process data according to the JSON Schema rather than relying only on the structure or values found in the baseline dataset. This will help ensure the system can process any valid dataset that follows the provided schema, including the updated dataset provided on Competition Day. This will be provided in the team's designated challenge resources folder in Google Drive.



Data Dictionary

The Data Dictionary explains what each field in the operational dataset represents, including its meaning within port operations, units or format, and relationships to other fields. Teams should use the Data Dictionary to understand the operational information represented in the dataset and determine how different data conditions or relationships may indicate an operational issue. This will be provided in the team's designated challenge resources folder in Google Drive.

Data Integrity

The system must accurately represent the information contained within the operational datasets provided. Teams may organize, calculate, analyze, or visualize the data as needed; however, the original data must not be altered in a way that changes the operational conditions being evaluated. Teams may create additional fields, calculations, or outputs derived from the provided data to support system functionality and issue detection.

Operational Conflict Detection

Port operations rely on multiple schedules, resources, equipment, and activities working together. Conflicts within operational data can affect the safe and efficient flow of port operations. Technology systems can help identify these conditions so they can be reviewed and addressed.

For this challenge, teams must develop their system to evaluate the complete operational dataset and detect the operational conflicts provided in the team's designated challenge resources folder in Google Drive. These conflicts involve relationships and conditions across vessel schedules, berth assignments, crane assignments, container movements, truck appointments, and other operational information represented within the provided dataset.

Teams should use the specific requirements and acceptance criteria provided in the team's designated challenge resources folder in Google Drive when developing and testing their system. The system must evaluate all applicable records and conditions and continue evaluating the dataset after a conflict is identified. A dataset may contain no conflicts, one conflict, or multiple conflicts.

Competition Day conflicts will follow the same requirements and acceptance criteria provided in the team's designated challenge resources folder in Google Drive. Teams should develop their system to evaluate the data according to these requirements rather than relying on specific values or conflicts found within the baseline dataset.

System Design Flexibility

Teams have flexibility in how they design and present their system. Systems may use dashboards, tables, charts, visual alerts, notifications, reports, or other methods to organize and communicate operational information. No specific user interface or visual format is required unless otherwise stated.

Regardless of the approach selected, judges must be able to clearly identify:

- The baseline operational data
- The updated data introduced during the demonstrated performance
- The results of the system's evaluation, including any operational issues identified

6.3 Software Submission Requirements

Teams must submit a final copy of their software by the deadline published in the Challenge Timeline. The software submission allows Digital Ship Challenge organizers and judges to review the system developed by the team and verify that the submitted software represents the system demonstrated on Competition Day.



Each team's software submission must be uploaded to the designated folder within the team's Google Drive as a ZIP file.

The ZIP file must contain:

- Complete software files necessary to review and run the team's system
- README file with instructions for installing, setting up, and running the software
- Required dependencies or instructions identifying any software, libraries, packages, or other dependencies needed to run the system
- Test cases used by the team to evaluate system functionality and issue detection
- Any additional files required for the system to operate as intended

The README should provide enough information for another person to understand how to set up and operate the team's software. At a minimum, it should include:

- System name and brief description
- Programming language(s), software, libraries, or platform used
- Installation or setup instructions
- Instructions for starting and operating the system
- Instructions for importing an operational dataset
- Any known setup requirements or limitations

6.4 Demonstrated Performance Procedures

The following procedures describe how the Technology Division demonstrated performance will be conducted. Teams should become familiar with these procedures prior to Competition Day to ensure a smooth and efficient demonstrated performance experience.

Procedure	Description
System Review	Judges will confirm that the team can display the original baseline dataset and explain how the system represents normal operational conditions.
Updated Dataset	The team will receive an updated operational dataset containing one or more changes to operational conditions.
Dataset Import	Teams will import the updated operational dataset into their system during the allotted time.
System Analysis	The system will process the complete updated operational dataset, evaluate all applicable records and conditions, and identify any operational issues or conflicts.
Code Documentation	Code should be organized and documented so that its purpose and functionality can be understood. Teams should use meaningful names and include comments where necessary to explain logic that may not be immediately clear.
Results Review	Teams will demonstrate the operational issues identified by their system and explain how their system



	communicates the issue and provides information to support user decision-making.
Judge Questions	Judges may ask questions about system functionality, issue detection, data handling, design decisions, or ask to have the system perform additional tests.

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

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

Software Submission

- ☐ Software has been submitted via Zip file in the folder in the team's Google Drive
- ☐ The submission included a README explaining how to install and run the software
- ☐ The submission includes the teams test cases
- ☐ Code includes comments explaining non-obvious logic
- ☐ The software has been run successfully on another machine

System Readiness

- ☐ The system can import JSON Operational Dataset as defined
- ☐ The system can reliably process valid datasets that follow the JSON Schema
- ☐ The system is accessible and usable offline with no Wi-Fi connection

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
- ☐ All team members can explain how the software works and why key design choices were made
- ☐ The team is prepared to modify their code during judging if asked

Teams are responsible for arriving on Competition Day prepared to compete. Failure to meet published deadlines, submit required materials, or comply with the technical specifications 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, reliable system development, and the ability to explain the technical decisions made throughout their project.

Teams will be evaluated on the following

Project Development	Evidence of planning, research, system design, software development, testing, refinement, and continuous improvement documented throughout the season in the Digital Notebook
Technical Performance	How effectively the system meets the challenge objectives and performs during the competition
Innovation	Creative thinking, problem-solving, and thoughtful design choices that improve the overall solution
Professional Communication	The team's ability to clearly explain their software development process, decisions, and results during the presentation and judge interview.
Professionalism	Teamwork, preparedness, organization, and respectful interaction with judges and event staff

Each evaluation area is scored using standardized judging rubrics. The official scoring rubrics will be provided in the appendix and should be reviewed by all team members.

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 their system works, why they made key technical decisions, and how testing and evaluation informed the development of their software. 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 software development process
- Develop a reliable system that meets the challenge requirements
- Use testing results to identify problems and improve system functionality
- Demonstrate understanding of their software and code
- Support technical decisions with evidence
- Communicate confidently and professionally
- Work effectively as a team



9. References

1. Software Development Process

GeeksforGeeks. “Software Development Process.” *GeeksforGeeks*.

[Software Development Process](#)

Accessed August 2026