DIVISION OF PROFESSIONAL DEVELOPMENT INSTRUCTION 3530.2B

Subj: SAIL TRAINING CRAFT (STC) NAVIGATION STANDARDS

Ref: (a) DNASINST 3120.1 (Series), SOP for Large Sail Training Craft

Encl: (1) Chart Preparation Checklist
     (2) STC Navigation Report

1. **Purpose.** To establish USNA navigation policies for Sail Training Craft.

2. **Cancellation.** PRODEVINST 3530.2A.

3. **Background.** Sail Training Craft are highly effective platforms for training and educating Midshipmen in the basics of leadership, seamanship and navigation. Safe and effective training requires that the Skipper, Executive Officer and Navigator always maintain an accurate navigation picture.

4. **Action.** All personnel assigned responsibility for navigation duties aboard any STC are required to carry out their duties in accordance with this instruction.

\[Signature\]

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Distribution: (electronically)
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Head Coach, Varsity Offshore Sailing Team
1. **Introduction.** The navigation of Sail Training Craft involves a distinct challenge compared to naval warships. Lacking the facilities and crew to staff a full Navigation team, allowances have been made to effect safe navigation within the context of other crew responsibilities. While nothing can take priority over safe navigation and contact avoidance a crew must also effectively sail the STC. Headsail changes, mainsail reefing and man over board recovery training are all critical elements of offshore sailing that may require the participation of an entire watch team. Such evolutions, if anticipated, should not preclude the effective navigation of the STC.

2. **Navigation Team Organization.** The Navigation Team will consist of the following required watch standers:
   
   a. **Navigation Plotter**
   
   b. **Bearing Taker** (collateral duty assigned to lookout or sail trimmer)

3. **Duties and Responsibilities**

   a. **Skipper.** The Skipper is ultimately responsible for the safety of the craft and all personnel onboard. The Skipper shall:

      (1) Review and sign all applicable charts, ensuring that the charts have been prepared in accordance with Enclosure (1). If being supplemented by digital navigation, ensure software is up to date with current chart data and is configured correctly.

      (2) Ensure that the proper fix interval is utilized.

      (3) Take early and sufficient action as required to prevent the craft from entering dangerous waters.

      (4) Immediately suspend inshore training if at any time only one source of positional information is available.

   b. **Executive Officer (XO).** The XO shall:

      (1) Be ready to assist the Skipper.

      (2) Ensure that the proper fix interval is utilized.

      (3) Review and sign charts.

      (4) Take early and sufficient action as required to
prevent the craft from entering dangerous waters.

(5) Immediately suspend inshore training if at any time only one source of positional information is available.

c. Navigator. The Navigator is a billet designated in writing by the Skipper and is responsible under the Skipper for the safe navigation of the STC. The Navigator shall:

(1) Ensure that all required charts are onboard. If employing digital navigation (VOST only) ensure that the navigation software (e.g. Expedition) is up to date and contains current chart data. Configure the software appropriately. Note: all STCs (including high performance racing chartered craft, are REQUIRED to carry up to date paper charts.

(2) Ensure that corrections to charts and publications are made prior to use and that all charts are approved for use by the Skipper and XO.

(3) Ensure that all crew members are capable of standing plotter and Bearing Taker watch positions. Give careful attention to the ship’s course and speed and available depth of water when approaching land or shoals.

(4) Personally supervise the navigation of the craft.

(5) Stay aware of current and forecasted weather conditions.

d. Watch Captain (OSTS Only). Each watch will have a Watch Captain, appointed by the Skipper. The Watch Captain shall assign watch positions to the crew, assuming a position as well. The watch captain may rotate his watch team through multiple positions including plotter and helmsman for training purposes.

e. Plotter. The Plotter shall:

(1) Maintain an accurate plot of the STC’s position utilizing visual, RADAR and/or GPS:

(2) Make recommendations to the Skipper/XO for the proper fix interval with respect to distance to shoal water.

(3) Act as time keeper for the fix intervals and inform the bearing takers of the approaching fix requirement.

(4) Receive all bearings to the visual navigation aids in use.
(5) Plot each visual, RADAR or GPS fix using appropriate fix symbol and label with 4-digit time. Immediately notify the helm if unable to plot a fix.

(6) Extend dead reckoning (DR) at least two fix intervals.

(7) Check soundings as indicated by the fathometer with charted depth after each fix.

(8) Maintain the bearing book by recording the time of each fix, the ranges utilized for each fix, and the soundings after each fix IAW the intervals listed in section (6).

(9) Maintain situational awareness to the nearest hazards to navigation at all times.

(10) Maintain situational awareness to the direction towards open/safe water along track at all times.

(11) Proactively and loudly give the STC Navigation Report per Enclosure (2).

(12) Notify the Helm, Watch Captain CO or XO whenever two independent sources confirming location of the STC are unavailable.

(13) Immediately notify the Helm, Watch Captain, CO or XO when the determination is made that the STC is heading into danger. Ensure that this report is acknowledged, and make course and speed change recommendations to prevent the craft from entering dangerous waters.

(14) Recommendations should be recorded in the STC Deck Log.

f. Bearing Takers. Deck hands (Lookout and Sail Trimmer) may be assigned the collateral duty of Bearing Taker. The Bearing Taker shall:

(1) Be proficient at taking accurate bearings with a hand bearing compass.

(2) Obtain accurate bearings to navigation aids designated by the plotter utilizing the hand bearing compass.

(3) Report bearings to the Plotter and advise when available navigation aids have been gained and lost.
4. Sources of Position. The Skipper / XO / Navigator shall maintain awareness of the position of the craft at all times, multiple positioning sources should be used when available to determine the most accurate navigation picture. The appropriate combination of these sources is dependent on the operating area, weather/visibility, the mission, and the proximity to hazards. When making an unfamiliar passage with heavy traffic and close proximity to shoal, precise methods such as GPS and charted navigational aids (NAVAIDS) should have precedence; in such circumstances, less-precise techniques such as seaman’s eye and comparison of fathometer readings should be used only to confirm multiple other sources of information, and should not be relied upon as the sole method of navigation. Plot a GPS fix when visual/radar fixes are unavailable or considered unreliable. Never hesitate to use GPS to verify or augment visual/radar fixes.

Sources of position may include:

(1) Global Positioning Systems (GPS) fix
(2) Visual Lines of Position (LOP)
(3) RADAR Ranges
(4) “Seaman’s Eye” (Estimated position relative to positively identified aids to navigation and prominent landmarks such as bridges, structures, or geographic features) Preplanned bearings at known ranges allow an accurate appraisal of where the craft is relative to the planned track. The disposition of the buoy field should not be relied upon unless the positions of the buoys and other marks have been checked to be in the correctly charted positions.

(5) Fathometer Readings. Parallel indexing and a constant watch of the fathometer will allow navigators to accurately determine distance of track and proximity to shoal water, but neither is to be considered an independent positioning source.

5. Electronic Navigation

a. With DNAP approval, the Varsity Offshore Sailing Team may use digital navigation as the primary means of navigation. A fully comprehensive paper chart folio will however, be embarked and ready for use (updated per enclosure (1)) at all times.

b. In all other cases (to include OSTS, ECA and Navy 44
Recreational Sailing), a digital Navigation Plotter is an additional "aid to navigation," but will not be the primary means of navigation.

c. Smart phone and tablet digital navigation applications can aid situational awareness for senior crew on deck but these devises must be employed with prudence and will not be the only/primary means of STC navigation.

6. Standards. All personnel assigned responsibility for navigation duties aboard any STC must carry out their duties in accordance with the following navigation standards.

   a. Charts to be used must be prepared in accordance with enclosure (1), Chart Preparation Checklist.

   b. Prepare a navigation brief prior to every underway outside the Annapolis operating area and include the following minimum information:


      (2) Tide and current calculations http://www.tidesandcurrents.noaa.gov/).


      (4) Status of navigation and engineering equipment

      (5) Emergency procedures

      (6) Operational Risk Management (ORM)

      (7) Lessons learned from previous underway periods

   c. The navigation brief must be presented no more than 24 hours prior to any underway outside the Annapolis operating area. In the case of restricted area transits that will occur greater than 24 hours after departing Annapolis, a brief must still be presented to the CO. All personnel assigned to the STC must be present at navigation briefs.

   d. Plot the craft's position utilizing no less than 3 visual or radar lines of position (LOP) or combination of visual and
radar LOPs. GPS is a valid fix source but, in the interests of training, should not be relied upon exclusively. Fix intervals will be in accordance with the following table:

<table>
<thead>
<tr>
<th>AREA</th>
<th>DISTANCE FROM LAND/SHOAL WATER</th>
<th>FIX INTERVAL (Under Sail)</th>
<th>Fix Interval (Under Power)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted Waters</td>
<td>Less than 2nm</td>
<td>3-15 minutes as conditions warrant*</td>
<td>3-15 minutes as conditions warrant*</td>
</tr>
<tr>
<td>Piloting Waters</td>
<td>2-10nm</td>
<td>6-20 minutes as conditions warrant*</td>
<td>6-20 minutes as conditions warrant*</td>
</tr>
<tr>
<td>Coastal Waters</td>
<td>10-20nm</td>
<td>15-30 minutes as conditions warrant*</td>
<td>15-30 minutes as conditions warrant*</td>
</tr>
<tr>
<td>Open Ocean</td>
<td>&gt;20nm</td>
<td>30 minutes</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

*The Skipper/XO shall determine or approve of the fix interval with respect to other actions on-deck, distance to potential navigation hazards and local shipping traffic. If at any time the distance to shoal water falls within (2) DRs of current position the STC shall alter course or reduce its fix interval. STCs under power shall strive to maintain the most conservative proscribed fix interval. Exceptions can be made during practice maneuvers (e.g. Man Overboard Drills, tacking and gybing drills) in local (Annapolis) waters.

e. On the paper chart used for Navigation, Dead Reckoning (DR) is the process of determining the future position of the craft by plotting course and speed from last fix. It does not consider any influencing factors such as tidal stream or wind. A DR plot must be maintained using the following six rules:

(1) At least every hour on the hour

(2) At every significant course change

(3) At every significant speed change

(4) When obtaining a fix or running fix

(5) When obtaining a single Line of Positioning (LOP)

(6) Plot and label a DR position with course, speed, and time along with a new course line from each fix or running fix as soon as it has been determined and plotted on the chart. The DR plot will show the next two fix intervals.
f. Exceptions. Two exceptions to this policy are permitted.

(1) Local area training. During local area training the navigation plot may be stood down once the craft has arrived in the pre-briefed training area.

i. Severn River Training: Due to the proximity of the Severn River training area crews are not required to navigate out of the Santee Basin. Due to the presence of shoal waters in the Severn River, danger bearings shall be pre-briefed and utilized.

ii. Local waters east of Greenbury Point. Crews training in local waters east of Greenbury point are required to navigate out of the Santee Basin until arriving at their pre-briefed training area. This may be accomplished with a local area chart (or approved chartlet) in the cockpit employing danger bearings. A full navigation plot is recommended but not required in local waters. Once on-station in the pre-briefed training area the crew may stand down the navigation for the duration of the training. An entry shall be made in the Deck Log when the navigation is stood down. It is the Skipper's responsibility to ensure that all training drills are accomplished in good water. Danger bearings shall be pre-briefed and utilized throughout the duration of training. When training is complete navigation shall be re-established and the crew shall navigate back to Santee Basin.

(2) Buoy Racing. The Varsity Offshore Sailing Team competes often in inshore buoy racing. These courses are established by qualified Race Committees or Coaching Staff in safe waters. Traditional chart navigation is not required while buoy racing. As stated above, however, crews shall navigate to and from the pre-briefed start-finish lines of the race course. An entry shall be made in the Deck Log when navigation is stood down.

7. Review. Director, Navy Sailing (DNAS) is responsible for annual review and updating of this instruction. DNAS will also ensure this instruction is an integral part of summer training.
NAVY SAILING CHART PREPARATION CHECKLIST

___ Ensure the chart is the latest edition and reference Notice to Mariners (NM) and Local Notice to Mariners (LNM). For chart corrections refer to: http://ocsdata.nce.navdata.gov/ntm/ and http://www.navcen.uscg.gov/?pageName=InnmMain

___ Do not write on or mark over written information on the chart (light characteristics, notes, etc) while prepping each chart. If circling an aid to navigation with pen, leave a space in the circle (or triangle) for text. Do not use red ink on the chart, it will not show up under red light at night.

___ Waypoints: Plot all in pencil on each chart using the waypoint list provided by the Operations Officer. Waypoints shall be a 1/8” solid round dot (no crosshairs), labeled WP1, WP2, etc. to coincide with waypoint list. Create the track specified on the waypoint list with a pencil.

___ Shoal water (18 foot contour): Outline on the chart with a blue Sharpie Permanent Marker, Ultra Fine Point. Outline all shallow areas (18 feet or less) within the deeper water. Outline all fish traps and fish haven areas in 18 feet or less. Outline security areas (such as Cove Point LNG terminal).

___ Corrections: Mark on the chart using the NTM and LNTM. Make ALL corrections to aids to navigation, and other corrections (shoal water, new obstructions, moved buoys, new fish trap areas, etc.) that occur in water 18 feet or deeper. Use Chart No. 1 as a reference to put new information on the chart, and the chart correction template to draw symbols.

___ Correction tree: Create a tree with three columns on the middle left margin of the chart. The first column will be the NTM or LNTM number (designated by the week/year it was made, for example 42/11 is week 42 of 2011). The second column is the date the correction was made by the chart preparer (1JUN12) and the third column is for the initials of the chart preparer (RM). If there are no corrections to be made, enter “00” in the NTM, the date and your initials as an indicator that the NTM was consulted. Use one line for each correction. Temporary corrections shall be made in black pencil, permanent corrections in black ink.

<table>
<thead>
<tr>
<th>NTM</th>
<th>Date</th>
<th>Initials</th>
<th>NTM</th>
<th>Date</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>42/11</td>
<td>1JUN12</td>
<td>RM</td>
<td>00</td>
<td>1JUN12</td>
<td>RM</td>
</tr>
<tr>
<td>13/12</td>
<td>1JUN12</td>
<td>RM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

___ Chart sounding datum: Highlight in yellow fluorescent highlighter.

___ Geodetic Datum: Highlight in orange highlighter. Note if not in WGS-84, and adjust chartplotter GPS on boat as needed.

___ Magnetic ring of compass roses: Highlight all on the chart in yellow highlighter. Highlight variation if true only (offshore charts).

Enclosure (1)
Unlit buoys: Identify all in water 18' or deeper by a 5/8" circle using a template; outline in black pen, and color with a green highlighter. Do not make “green” using a yellow and blue highlighter – it can not be read under a red light at night.

Bridges: For all bridges on track, highlight bridge controlling height, crossing point and center span location in yellow highlighter.

Radar navigation aids: (nav aids with a RACON and prominent points of land) Identify using a 5/8” triangle using a template; outline in black pen, and color with a blue highlighter. Radar nav aids will have a two or three figure identifier, with “R” as the first letter for Radar. RACON buoys will be labeled by their buoy number. Land or land based objects will use one or two letters following “R”, i.e. “RP” for a pier or “RTP” for Turkey Point.

Visual navigation aids: (lit and unlit buoys can be used in addition to land based visual aids such as lights on fixed structures, tanks, spires, and prominent points of land) Identify by using a 5/8” circle using a template; outline in black pen, and color with a yellow highlighter. Visual aids are used for shooting a line of position (LOP) and will have an identifier starting with “V” as the first letter. Buoys will be labeled by “V” and their buoy number, i.e. V 87 for buoy 87 on the Chesapeake Bay. Land based aids will use up to three letters or numbers following “V” i.e. V CD for Chapel Dome or V RT1 for Radio Tower 1. Ensure visual aids on overlapping charts have the same identifier for recording in the bearing log. Choose nav aids that can be used in daylight and/or night, and that you can triangulate for a fix.

Fold and label the chart: Fold the chart in fourths – top to bottom, then left to right, with the back side out. Label in legible 1” block letters on the bottom right had corner of the folded chart – the chart number and name. Immediately above the label, write the number of the connecting chart (from the chart list provided by the relevant sailing program Operations Officer); immediately below the label, write the chart number of the following chart. The numbers of the previous and following charts should be 1/3” letter. For example:

Chart: 13224
Chart: 13223 NARRAGANSET BAY INCLUDING NEWPORT HARBOR
Chart: 13218

Track: When approved by the Skipper, mark it with a black Sharpie, Ultra Fine Point. Each straight-line segment of the track will be labeled with the magnetic course (TRxxxM) and Speed of Advance in knots (SOA x.x). This marking will be placed along each segment at least once.

Approval: Each Skipper and XO is responsible for the final approval of their boat’s charts. After review and making any necessary corrections, the Skipper will sign “Block # __ (year)__ Approved by:________________(Skipper and XO signature)” in the bottom left margin of the chart.

Enclosure (1)
NAVY SAILING NAVIGATION REPORT

A minimum of two Navigation Reports shall be made at the completion of every fix from the Plotter to the Helm.

After the initial fix and DR is plotted an initial assessment will be made and reported to the helm:

"Based off a/an (excellent, good, fair, poor) (visual, electronic) fix Navigation shows us in (Safe Water, Danger)."

Any report of "Danger" will be immediately followed by a recommended avoiding action.

The Navigator shall repeat the report(s) until acknowledged by the Helm and Skipper/XO.

After the report is acknowledged the Navigator will continue with the log-keeping requirements and then make a secondary (full) report:

"Based off a/an (excellent, good, fair, poor) (visual, electronic) fix at time _______. Navigation recommends you (maintain course and speed, alter course and speed to__________). The nearest hazard to navigation is _____________, ___ yards off the (starboard, port) (bow, beam, quarter). The nearest aid to navigation is _____________, ___ yards off the (starboard, port) (bow, beam, quarter). The fathometer (concurr/does not concur) with charted depth. Distance remaining on this leg is _________ yards, Time to turn is ________. Next course is___________ degrees (magnetic)"

The Navigator shall repeat the report(s) until acknowledged by the Helm and Skipper/XO.

Enclosure (2)