Skagerrak Code User Guide

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1 General

1.1 Installation

1. Install LibreOffice. See Section 1.7 for LibreOffice options.
2. Create a file folder for the code files. Download the spreadsheet files and the sounds folder to that location.

1.2 Spreadsheet Files and Versions

Three LibreOffice Calc spreadsheet files are used for the Skagerrak game. The scenario spreadsheet (Section 2) is used to create game scenarios, the game spreadsheet (Section 3) is used to play the game,

and the plot spreadsheet (Section 4) is used to create ship position plots and gunnery logs.

The three spreadsheets share two version numbers, one shared between the scenario and game spreadsheets and one between the game and plot spreadsheets. These version numbers are included in the comma-delimited data files written and read by the spreadsheets to insure consistent file formats.

1.3 File Locations

File folders required by the Skagerrak spreadsheets are either created by the user prior to use of the spreadsheets (denoted by [R]) or created automatically when the spreadsheet macros are run (denoted by [A])

The name of the top level folder, shown here as ‘SK Code’, is arbitrary. In order to allow the macros to run, this folder and its path should be listed as a Trusted File Location in the Trusted Sources tab of the Macro Security section of LibreOffice Options, Security.

SK Code [R]	Spreadsheet files (LibreOffice Calc: *.ods)
╚ sounds [R]	Sound files used by the macros (*.wav or *.ogg)
╚ scenarios [A]	File folder created by the scenario spreadsheet and containing scenario files read by the game spreadsheet.
╚ *name* [A]	Scenario folder created by the scenario spreadsheet and containing player aid pdf files.
╚ out [A]	Output file folder created by the game spreadsheet.
╚ *name*-yyyy-*mm*-*dd* [A]	Game output folder created when the scenario is loaded. Includes Narrative and Table Status files, as well as diagnostic files.
╚ Force*x* [A]	Player turn reports for forces 1-6. At a minimum, Force1 will be for side 1 and Force4 for side 2.
╚ Detail [A]	Turn by turn diagnostic files.
╚ plot [A]	Plot data file for the plot spreadsheet.
╚ Gunnery [A]	Gunnery firing and hit data used by the plot spreadsheet to create gunnery logs.
╚ *force* [A]	Gunnery file folders for each force created by the plot spreadsheet.
╚ saveturn [A]	Backup files for recovery in case of a crash.

1.4 Macros

LibreOffice macros are used to perform the spreadsheet functions. In order to speed execution, screen updates are turned off while the macros are running. Message boxes will be displayed when the macros are completed. Do not attempt to modify spreadsheet cells while any macro is running. Do not attempt

to run more than one macro at a time.

1.5 Dates

Some of the dates in the data tables are in the form:

yyddd

where *yy* is the year after 1900 and *ddd* is the day of the year.
Examples:

00001 is January 1, 1900
05147 is May 27, 1905
16152 is May 31, 1916

1.6 Cell Protection

On protected sheets, either all cells are protected, or all cells except user input cells are protected. For non-protected sheets it is quite easy to accidentally overwrite a cell formula and cause errors which are difficult to identify. Caution is advised.

1.7 LibreOffice Options

These LibreOffice settings are recommended. They are found under ‘Options’ in the ‘Tools’ drop down menu.

LibreOffice – Security – Macro Security. Security Level High or Very high. Set the spreadsheet location under Trusted Sources (see Section 1.3).

LibreOffice Calc – View – Comment authorship. Unchecked.

LibreOffice Calc – View – Visual Aids – Grid lines. Show on colored cells.

2 Scenario Spreadsheet

The scenario spreadsheet is used to create game scenarios. Each scenario is on a separate sheet. These input sheets can be copied and modified for additional scenarios. Names of input sheets are arbitrary, but short names will avoid long output file names. Besides the input sheets, the other sheets are:

Ship Data	Data specific to individual ships
Weapon Data	Gun and torpedo data
Class Data	Data common to ship classes
Simulation Input	Miscellaneous intermediate values and inputs
Scenario	Data generated by the macros for writing the output files
Roster Side 1	Data for side 1 ‘data’, ‘log’, ‘station’ and ‘torp’ pdf files (Section 2.3.2)
Roster Side 2	Data for side 2 ‘data’, ‘log’, ‘station’ and ‘torp’ pdf files
Leads Side 1	Data for side 1 ‘leads’ pdf files
Leads Side 2	Data for side 2 ‘leads’ pdf files
Plot	Plots of initial locations
Buttons	Control sheet for running macros

2.1 Scenario Creation

To create a scenario, any existing input sheet can be modified, or a new sheet can be created by copying an existing sheet. The current input sheets are listed on the Buttons sheet. If input sheets are added, deleted or modified, the list can be updated using the ‘Update List’ button. All input sheets must be located after (i.e., to the right of) the Buttons sheet.

On the input sheets, input cells have yellow backgrounds. Other cells should not be modified. Some input cells may be overwritten by the macros.

Cell A2	Scenario name. Arbitrary text, displayed by the game spreadsheet and printed on the player aid files.
Column B	Ship number as listed on Column A of the Ship Data sheet. Flotilla values will be generated automatically, starting with 2001 for side 1 and 3001 for side 2. These values are for scenario generation only and are not used by the game spreadsheet.
Column D	Position of ship in a unit. These may be overwritten based on unit designations. Flotillas and single ships should have a value of 1.
Columns E, F	Initial north and east positions in nautical miles from an arbitrary reference point. Positions for most ships (non-lead ships in formations or ships stationed on other ships) will be overwritten. Typically, only one guide ship for each force needs to have a position specified, and all the others will be positioned based on stations or formations.

Column G	Unit designations. These must be identical for all ships in a unit. Text should be short and should not include spaces. All ships of a unit should be adjacent in the list. The formation positions will be assigned top to bottom, with the top ship as the unit lead. Ideally, units should be no more than 4 ships. Units of 5 or 6 may work, but some formations and maneuvers will be problematic.
Columns H, I	Initial course and speed. These may be overwritten for ships in formation or stationed.
Column J	Force number. Side 1 forces are 1 through 3 and side 2 forces are 4 through 6. Most scenarios will use only forces 1 and 4. The guide (typically the flagship) for each force must be *n*F (e.g., 1F for force 1, 4F for force 4).
Column K	Fire control efficiency. Nominally 1. Lower values (between 0 and 1) can be used for ships not considered fully efficient.
Column L	Initial formations as listed in the comment on cell L4 and described in the player guide. Generally all ships in a unit will have the same formation, but unusual formations can be created by mixing. Not all combinations will work well in the game.
Column M	Maximum speed. Normally 99 to use the class data value. Reduced or increased values (in integer knots) can be entered.
Column N	Alternate names. These are required for flotillas and will appear in column C. Alternate names can also be used for other ships to override the ship data name.
Columns O, P	Alternate gun elevations. Normally blank, but values (in integer degrees) can be entered to override the weapon data elevations.
Column Q	Default value must be 99. This column has three separate functions. 1: For flotillas, it gives the number of boats in the flotilla. 2: For battleline ships, it can be used to designate a fast wing or reserve unit (used only by computer controlled sides). 3: To designate a light cruiser as a flotilla leader (including scouts, protected cruisers and flotilla leaders) it is the number (from this sheet, column A) of the associated flotilla.
Column R	Default value 0. This column has two separate functions. 1: For flotillas, it is the class code of the boats (from the Class Data sheet, column A). All boats in a flotilla will be of the same class. 2: For other ships it can be used to override a date dependent refit listed in columns P through T of the Ship Data sheet. See the comment on cell R2.
Column S	AP/HE fraction. Default value 0. Other values between 0 and 1 will override the nation and date dependent values in the game spreadsheet. These values determine the portion of the initial ammunition load that is armor piercing for guns that have multiple shell types.

Column T	Column/Screen Distance. Default value 500 yards. This column has two separate functions. 1: If the value is >= 100, it is used to modify the stem-to-stem distance in yards between a ship and its next ahead. 2: If the value is <100, it is not used [ship specific screen distance is not currently implemented].
Columns U, V, W	Station values, specifying the guide ship number (from this sheet, column A), relative bearing from the guide in degrees and distance in nautical miles. For ships not stationed, the column U value should be 0. Non-lead ships in multi-ship units cannot be stationed.
Column X	Alternate nationality. Default value blank. Can be used to override the nationality of the ship (from the Ship Data sheet, column K). Values are 1 through 8 as listed in cells F38-G46 of the Simulation Input sheet.
Cells Z4, Z6, Z7	Year, month and day of the scenario. Dates should be from January 1, 1900 to about 1920. While there are ships included which were built, designed, proposed, or imagined in the 1920s, post WW1 technology is not well modeled by the game algorithms.
Cells AB4, AB5	Hour (0-24) and minute of the scenario start time. Since night action is not fully modeled, scenarios should be designed so that combat will not occur at night.
Cells AD6, AD7	Latitude and longitude values in integer degrees. Used with the date to determine nautical twilight times. Longitude values are relative to the center of the time zone and must be -7 to +7.
Cell AD8	Time zone. Set to 0. Actual time zones are not implemented.
Cell AB8	Operation mode. Default value 0. Other values not completely implemented.
Cells Y12, Z12	Visibility changes in yards per 5 minute turn. Default values 0. Y12 is for the worst visibility direction and Z12 for the best. Values may be positive (improving visibility) or negative (decreasing visibility).
Cells Y13, Z13	Minimum and maximum limits (in yards) for changes in visibility.
Cells Y15, Z15	Worst and best visibility distances in yards. If these are not the same, the best value will apply when looking in the direction entered in cell Z17, and the worst value will apply when looking in the opposite direction. Other direction visibilities will be scaled between these values. Smoke will typically be visible beyond these limits.
Cells Y16, Z16	Worst and best visibility fractions (<=1). Lower values will reduce sighting probabilities. Typical values should be ~0.6 to ~0.9.
Cell Z17	Best visibility bearing in degrees (000 to 359). See Y15, Z15 above. If the worst and best visibility distances are equal, this value is irrelevant.

Cell Z19	Station courses. Select 0 for stationed ships and their units to adopt the initial course of the station guide, 1 for the stationed ships to keep the entered course and for their unit(if any) to adopt that course, 2 for all ships to keep their entered course.
Cells Y22, Z22	Plot reference point (North, East) in inches. Default values 0.
Cell AA23	Maximum limit for wind speed changes in integer knots.
Cell AA24	Code for wind direction changes, described in cell comment.
Cell Z25	Initial wind speed in integer knots. Value should be in the range shown in cell AB26, once sea state has been entered.
Cell AA25	Code for wind speed changes, described in cell comment.
Cell Z26	Sea state. Actually the wind force value from cells L2-O15 of the Simulation Input sheet. Wind and sea conditions are not modeled independently. The game spreadsheet will determine changes in sea state based on changes in wind speed.
Cells Z27, AA27	Default screen distances for sides 1 and 2 in nautical miles. These set the spacing between individual ships in screen formations.
Cells Z28, AA28	Screen order codes for sides 1 and 2. Default values 0. Can be used to reverse the direction from the unit lead ship of some screen formations.
Cells Z33, Z34	Names for each side.
Cells AB30-AB35	Names for forces.
Cells Z35, AA35	Fleet guide. Not used for output files. Can be used to determine relative bearings and distances of each ship in a side to the specified ship (number from this sheet, column A). These bearings and distances will be in columns CK through CM of the Scenario sheet.
Cells Z37-AC38	North and east positions in nautical miles of destination and retreat points for use by computer controlled sides.
Cells Z41-AC50	Shorelines. Default values 999. Other values define shoreline points in nautical miles. Each shoreline is a series of lines connecting the points.
Cells Z64-AC83	Quadrilaterals (minefields, islands, shoals). Default values 999. Other values in columns Z and AA define quadrilateral points in nautical miles. Other values in column AB define the character of the quadrilateral. For minefields, specify the number of mines, nationality and whether the minefield is known to each side. For islands, specify the height above sea level in feet. For shoals, specify the depth of water in feet.
Cell Y87	Scenario notes. Optional text for reminders when loading the scenario in the game spreadsheet, e.g., required adjustments to doctrine or simulation inputs.

2.2 Side and Force Organization

Ships larger than destroyers are assigned to units representing squadrons or divisions of up to 6 ships (4 or less is optimal). Destroyers, torpedo boats, minesweepers, convoys and trawlers are defined as flotillas of identical vessels and are not treated individually.

When creating the data rows for a scenario, these rules apply:

1. Enter all of side 1 above all of side 2.
2. Enter all of a force above a higher numbered force.
3. Enter all ships of a unit together, and in the order they will steam when in column. The first ship in each unit is called the lead ship.
4. It is preferable for ships stationed on other ships to be below the guide ship. Otherwise, some iteration of the macro may be required to generate proper positions.
5. Ships which are not the lead or sole ship in a unit cannot be given stations. They will be positioned relative to their unit's lead ship based on the formation.

The capability to assign more than one force to a side is provided to allow multiple players to control independent formations with limited knowledge of other friendly forces, e.g., fleets with formations from allied nations. More than one force for a computer controlled side is not recommended since there is insufficient code to allow them to cooperate.

2.3 Scenario Generation

Buttons on the Buttons sheet are used to run the macros that generate the scenario output files. The 'Test Scenario' and 'Save Scenario' buttons ask for a sheet name (case sensitive name of a sheet with the desired scenario inputs) and read that sheet to update the data on the Scenario, Roster, Leads, and Plot sheets. The 'Save" button only differs from the 'Test' button in that it also writes the scenario files to be used as input to the game spreadsheet.

The scenario file name is of the form:

sksen-*version*-*scenario*-*year*-saved-*date*.txt

See Section 1.3 for file locations.

2.3.1 Plots

After a scenario is generated using the 'Test Scenario' or 'Save Scenario' buttons, the Plot sheet displays the initial positions, shorelines and quadrilaterals.

There are three charts on the Plot sheet, all with scales in nautical miles. One nautical mile equals 4 inches or 1 inch = 500 yards, a scale of 1:18000.

The top chart shows the table layout, with a dashed blue line indicating the table edges. The size of the table (in inches) can be changed using cell AX4 to select a size from the data in cells AZ4 through BE17. Changing the table size may require adjusting the size and scaling of the top chart.

The middle chart is scaled from -50 to +50 nautical miles (north and east), which should generally allow both sides to be seen.

The top and middle charts can be centered on any ship by entering the row value for that ship in cell V2. Entering 0 in cell V2 will put the ships in their actual nautical mile positions, which may be off scale. Alternatively, the positions may be shifted using cells L2 and M2. Non-zero values in cell V2 will override those in L2 and M2.

The lower chart is scaled from -50 to 600 nautical miles (north and east), which should generally allow all shorelines and quadrilaterals to be seen. No re-centering is provided.

2.3.2 Player Aid pdf Files

After a scenario is generated using the ‘Test Scenario’ or ‘Save Scenario’ buttons, the ‘PDF Player Files’ button on the Buttons sheet can be used to create four player aid pdf files for each side. The files are written to a folder in the ‘scenarios’ directory with a folder of the same name as the selected scenario sheet. The file names are of the form:

scenario-Side*X-side name-XXXX*.pdf

where *XXXX* is either ‘data’, ‘log’, ‘station’, ‘leads’, or ‘torp’.

The ‘data’ file provides basic information about the ships/flotillas/etc.
The ‘log’ file lists the ships and has blanks to enter course and speed for each turn.
The ‘station’ file lists the ships and has blanks to enter station guide, relative bearing and distance.
The ‘leads’ file is similar to ‘logs’, but includes only unit lead ships, single ships, or flotillas.
The ‘torp’ file provides torpedo information for the ships.

3 Game Spreadsheet

The game spreadsheet is used to run game scenarios. Sheets denoted by [P]) do not have cells overwritten by macros and are protected. Sheets denoted by [PM] have cells overwritten by macros and are protected except while the macros are running. No passwords are used for protected sheets. Sheets not needed during games may be hidden (see Section 3.6). The individual sheets are:

Class Data [P]	Data for ship classes
Weapon Data [P]	Gun, torpedo, mine, and rangefinder data
Armor [P]	Armor data for ship classes
Firing Input	Miscellaneous intermediate values and text definitions
Simulation Input	Simulation values
TorpQue	Running torpedo salvo and smoke screen data
Gunnery	Miscellaneous intermediate values and force data
PriGuns	Current primary battery data for ships with mounts modeled separately.
Plot	Plot of current locations
Doctrine	Inputs for player doctrine and game setup
Battle Orders	Inputs for player battle orders
Scenario	Player order inputs and current ship data
Output [PM]	Current game outputs
Buttons [P]	Main sheet for running macros

3.1 Scenario Loading and Reset

The ‘Load Scenario’ button on the Buttons sheet will allow selection of a scenario file created by the scenario spreadsheet. See Section 1.3 for file locations. Loading will create a file folder under the ‘out’ folder of the form:

scenario-year-month-day (where the date is the loading date)

Loading will create initial narrative and force output files. The force output files will be in sub-folders. If the files already exist they will be overwritten.

The ‘Reset Scenario’ button on the Buttons sheet will restore the initial values of the loaded scenario and overwrite the initial output files. If the reset is performed on a later date the load date will be used and the output files will still be overwritten.

3.2 Simulation Inputs

The Simulation Input sheet has a significant number of values that adjust code algorithms. It is recommended that they only be modified by experienced users.

3.3 Computer Control

One or both sides may be controlled by the spreadsheet’s algorithms. The use of the term ‘AI’ for some of the inputs and displays is conveniently short, but an exaggeration. There is no intelligence, just algorithms. See Section 3.6, cell E8 for AI control options.

3.4 Doctrine and Game Setup

The Doctrine sheet has inputs for automatic behavior of ships under various conditions (doctrine) and inputs for specific game setups. Ideally, experienced players should chose their doctrine options.

Cell C3	Position Output Units, inches or nautical miles. Force output files will show positions in these units. Use inches if the players will be moving the models on the table. Positions in inches may be adjusted to keep the action on the table and may not be consistent from turn to turn.
Cell C4	Scale (yards per inch). Nominally 500, which is 4 inches per nautical mile, or a scale of 1:18,000. This scale works reasonably well for 1:6000 scale models. WWI capital ship spacing in column was about 500 yards stem to stem, so the ship miniatures should be less than an inch long, including bases. My 1:6000 scale models are used with bases about 4 mm longer than the ships, so there is some distortion for units of longer ships. Since the code keeps accurate positions, the distortion is mainly an aesthetic issue.
Cell C5	Position reports. Determines where the position outputs are sent when the Position Outputs button on the Buttons sheet is pressed (see Section 3.6). Select 0 for outputs to both the force files and the table status file, 1 for only the table status file.
Cell C6	Force report detail. Select 0 for high detail, 1 for realistic detail.
Cell C7	Ships listed on table status file. See cell drop-down menu.
Cell C8	Single or multiple turns on force output files. Select 0 for force files to include all turn outputs, 1 for a force file to be created for each turn.
Cell C9	Pdf force output files (only created when running single turns and when Cell C8 is set for single turn force files). Select 0 for no pdf force files, 1 for pdf force files to be in the same folders as the text force files, 2 for all pdf force files to be in the plot folder.
Cell C10	Secondary/medium output flag. Select to 1 to include secondary battery hits in the force output files and medium caliber hits in the gunnery data file. This data is useful for pre-dreadnought period scenarios.
Cell C13, D13	(doctrine) DD/TB gun target option. See cell drop-down menu.
Cell C14, D14	(doctrine) Tertiary gun target option. See cell drop-down menu.
Cell C15, D15	(doctrine) Torpedo launch number doctrine. See cell drop-down menu.
Cell C16, D16	(doctrine) Torpedo launch repeat doctrine (not for DD/TB flotillas). See cell drop-down menu.
Cell C17, D17	(doctrine) Assign battlecruisers to battleline. See cell drop-down menu.
Cell C18, D18	(doctrine) Assign armored cruisers to battleline or screen. See cell drop-down menu.

Retreat codes table	(doctrine) Determine the automatic reaction of ships (by type) for various conditions.
Aircraft options	(doctrine) Determine the automatic reaction of aircraft.
Battle Orders table	Used to apply battle orders defined prior to the game (see Section 3.5).
Apply Battle Orders button	Applies battle orders selected in the Battle Orders table.
Print Battle Orders button	Prints battle orders from the Battle Orders sheet to files for each side.

3.5 Battle Orders

The Battle Orders sheet has cells for entering up to two sets of formation and station orders for each side. Prior to the game, players may create two fleet dispositions which can then be invoked prior to any turn by using the Battle Orders table and the Apply Battle Orders button on the Doctrine sheet.

3.6 Game Controls

Two cell inputs on the Button sheet should be checked or changed prior to running game turns:

Cell E7	Maneuver Mode. Normally 0 to run single turns for normal game play. See cell drop-down menu for other options. Operational movement mode is not completely implemented.
Cell E8	AI mode. Determines which sides, if any, are controlled by the code. See cell drop-down menu for options. The scenario should be reset after changing this mode.

Buttons on the Button sheet perform the following functions:

Run Turn	Runs the next turn or multiple turns, depending on the Maneuver Mode (see cell E7 above). If multiple turns are running, entering the letter ‘s’ in cell E6 will stop the macro at the end of the turn currently in progress.
Reset Scenario	See Section 3.1.
Load Scenario	See Section 3.1.
Verify Orders	Writes the current player orders to the force output files. This optional step allows players to verify that their orders have been correctly entered prior to running a turn.
Position Outputs	Writes the current ship positions (in inches) to the table status file and/or the force files (see Section 3.4, Cell C5). This is useful if the table positions have been adjusted (e.g., to keep the action on the table).
Action Lull Report	Writes a file to a force folder listing the number of operational primary guns, remaining torpedoes, remaining ammo and maximum speeds of that force’s ships. This represents the commander asking for a status during a lull in the action. Some ships may not be able to reply.

Hide Scenario Columns	Hides columns on the Scenario sheet specified by the flags on row 160 of that sheet. This brings the order input columns closer together to facilitate entering orders.
Show Scenario Columns	Shows all columns on the Scenario sheet.
Hide/Unhide AI Rows	Hides or shows rows on the Scenario and Output sheets associated with computer controlled ships. This makes it possible for a user to play scenarios against the computer algorithms without seeing the opposing orders or status.
Hide Sheets	Hides the sheets not needed for running a game.
Unhide Sheets	Shows all sheets.
Reset Screen Update	Turns screen updates on. Since screen updates are turned off during macro operations, a macro code crash may leave screen updates off.
Update Columns	Reorganizes the units based on the current ship conditions. Since this is performed automatically by the macros several times during a turn, use of this button should not be necessary.

3.7 Player Inputs

For each 5 minute game turn the players should provide the game master with orders for their forces. See the player guide for details.

The game master will transfer the orders to the Scenario sheet. After the inputs are adjusted, the Verify Orders button (Section 3.6) can be used to write the orders to the player's force output files for the players to check. This verification step is not required, but will help to detect errors in order entry.

Input cell columns (starting from row 5) used on the Scenario sheet are:

E	Primary Auto. Targeting order for primary guns. See cell E4 comment for descriptions.
F	Ordered Course. 0-359 degrees. See cell F4 comment for meanings of background colors.
G	Ordered Speed (in knots). See cell G4 comment for meanings of background colors. Speeds above the current maximum speed will be reduced when the turn is run.
H	Primary Target. Used only for manual targeting (Row E). Enter the target ship's number from Row B. Numbers for side 1 start with 1, those for side 2 start with 201.
I	Secondary Mode. Targeting mode for secondary guns. See cell I4 comment for mode descriptions.
J	Secondary Target. Used only for manual targeting (Row I). Enter the target ship's number from Row B.

K	Formation Code. See cell K4 comment and the player guide. All ships in a unit will generally be given the same formation.
L	Torpedo Auto Target. Torpedo targeting order. See cell L4 comment for descriptions.
BA	Open Fire Range. Range in yards beyond which the ship will hold fire. See cell BA4 comment and the player guide.
BI	Make Smoke. Options for a ship to make extra funnel smoke or, if available, chemical smoke. See cell BI4 comment and the player guide.
BL	Updated Unit Designation. Not normally used. Column OA entries will cause the unit designation to be revised.
BU	Torpedo Manual Target. Used only for manual targeting (Row L). Enter the target ship's number from Row B.
CG	Torpedo Speed Doctrine. Normally 0 to allow ships to select the most appropriate torpedo speed setting. Selecting 1 (fast speed/short range) will force the use of the fast speed setting.
CP	Retreat Immune. Normally 0 to allow ships to react in accordance with doctrines (Section 3.4). See cell CP4 comment.
DK	Flotilla Turns. Normally 0 for flotillas of destroyers or torpedo boats to turn away after torpedo launches. See cell DK4 comment.
ED	Ship number of station guide. Used to station lead or independent ships (see player guide). Enter the desired guide ship's number from Row B.
EG	Relative Bearing in degrees from the station guide. Negative values will cause stationed ships to move to the disengaged side of guides which are firing.
EH	Distance from the station guide (in nautical miles or yards). Values of 100 or more will be treated as yards and converted to nautical miles.
EI	Station speed delta. Set for lead ships only. Causes unit lead ships to take station at less than the unit's maximum speed. Useful to allow non-lead ships in a unit to catch up or keep up.
LX	Bearing Rider. Normally 0 to allow intercept courses when taking station. If the value is 1, the ship taking station will move toward the current position of the guide in each 1 minute impulse.
LY	Aircraft Flag. See cell LY4 comment.
MD	Hold Fire. Normally 0. See cell MD4 comment.
ME	Hold Primary. Normally 0. See cell ME4 comment.
NP	Player Force. Normally set only for force flagships unless there are multiple players in a force. See cell NP4 comment.
NS	Column Distance (yards). Set initially by the loaded scenario. Used to adjust the stem-to-stem distance in yards between a ship and the next ahead in a unit.

NT	Screen Distance Override. Used to change distance to ship ahead for non-lead ships in screen formations. Not used for circular screens.
NU	Screen Order Flag. Options for directions which screens form. See cell NU4 comment.
OA	Dropout Code. Option for removing ships from units. Useful when damaged ships would reduce a unit's speed. See cell OA4 comment.
OO	Force Battleline Flag. Indicates ship is assigned to the battleline. Values are assigned by the code.
OP	Force Battleline Order. Used only by computer controlled sides.
PS	Primary Shell Selection Type Doctrine. Options for automatic shell selection. See cell PS4 comment.
PT	Primary Shell Selection Range Breakpoint. Range in yards at which shell type will automatically change, based on Column PS doctrine.
PU	Primary Shell Selection Type Selection. Normally 0 to allow selection based on target type. See cell PU4 comment for other options.
SY	Do not target. Normally 0. See cell SY4 comment for other options.
TM	Ship number from Row B for bearing and range calculation. Normally blank. If used, values in columns TO through TQ will be updated at the end of the turn.

3.8 Game Outputs

For each 5 minute game turn, various files are created or extended. See Section 1.3 for file locations. Output files not mentioned here are diagnostic reports for code development.

SK-Narrative-...	Used for post game reports.
Table Status Turn …	Used by game master for placing or moving models and markers on the table.
Gunnery/SK-Gun-Logs-…	Input to plot spreadsheet. See Section 4.3.
plot/sk...plot…	Input to plot spreadsheet. See Section 4.1.
Force*n*/Force*n side*….	Player report for the previous turn or all previous turns. See the player guide for details.

3.9 Game Plot

The Plot sheet of the game spreadsheet also gives ship locations, both table form and as a plot. The plot also indicates (by gray circles) the apparent smoke directions. Markers placed next the ship models will show the players where smoke may obstruct visibility.

The plot may be modified using the following cells on the Plot sheet:

Cell E1	Labels. Select 0 for names on lead or screen ships, 1 for names on all ships, 2 for unit names or 3 for names on lead, out of formation or screen ships.
Cell G1	Display. Show ships on plot based on side and or visibility. See cell drop-down menu.
Cell J2	Center plot on ship. Enter 0 for plot to use actual positions converted from nautical miles to inches. Enter a ship number from column A to center plot on that ship.
Cells E4, F4	North/East offsets in inches. If cell J2 is 0, plot will be offset by these values. See cell comments.
Cell AX4	Select Table Box. The plot has a dashed blue line indicating the table edges. The size of the table (in inches) can be changed using cell AX4 to select a size from the data in cells AZ4 through BE17.
Cell AY18	Display Unit. Entering a lead ship number from column A will display the ships of that ship's unit on the plot at column AY and row 27, with the lead ship at the center.

3.10 Game Turn Sequence

1. Get orders from players.
2. Enter orders on the Scenario sheet.
3. Verify the orders (optional).
4. Run the turn.
5. Give updated force output files to players.
6. Reposition ships and markers on table.

4 Plot Spreadsheet

The plot spreadsheet is used to create plots of ship positions and gunnery logs. The individual sheets are:

Chart	Plot output
Buttons	Main sheet for running macros
Data	Data read from plot data file created by game spreadsheet.

4.1 Plot Loading

The ‘Load Plot’ button on the Buttons sheet will allow selection of a plot file created by the game spreadsheet. See Section 1.3 for file locations.

4.2 Plot Drawing

The ‘Draw Loaded Plot’ button on the Buttons sheet will create a plot of ship positions on the Chart sheet. Options for plotting are selected using yellow cells on the Button sheet.

Cell C14	Starting time point for the plot. Each point is one minute of game time.
Cell C15	Ending time point for the plot. Entering -1 will use the last time point on the plot data file.
Cell C16	Pause time in seconds between drawing each time point. Normally 0, but can be used to slow the plotting while watching the Chart sheet.
Cell C17	Torpedo filter. Normally -1, but can be used to avoid plotting small torpedo salvos.
Cell C18	Lead filter. Normally 0. 1 for plotting only unit lead ships, 2 for lead and independent ships.
Cell C19	Side filter. Normally 0. 1 or 2 to plot only side 1 or 2.
Cells C20-L20	Ship filter override. Normally all 0s. If any are non-zero, only the ship numbers entered (from column A of the Data sheet) will be plotted.
Cells C22-H22	Force filter. Normally all 0. Enter 1 to **not** plot the associated force.
Cells C23-L23	Type filter. Normally all 0. If any are non-zero, only the ship types entered (from column C of the Data sheet) will be plotted.
Cell C25	Sunken ship filter. Normally 0. See cell menu.
Cell C26	Time Units. Sets labeling of plot time points.
Cell C27	Time Labels. Normally 0 for labels every 20 points. Otherwise, number of time points between labels.
Cell C28	OP Time Labels. Normally 0 for labels every 20 operational turns. (Operational turns are not completely implemented in the game spreadsheet)

Cell C29	Shoreline Filter. Normally 1. See cell menu.
Cell C30	Label all ships. Normally 0 to label only lead, screen and independent ships.
Cell C31	Torpedo launch persistence. See cell menu.
Cell C32	Sunk label offset. Normally 150. Adjusts position of labels for sunken ships.
Cell C33	Tic marks on all plots. Normally 0 for tic marks only on unit lead ships, otherwise all plot lines will have tic marks every minute.
Cell C34	Target lines. Normally 0. See cell comment for selection of firing lines to be drawn.
Cell C35	Target line time. Normally 0 for target lines every minute, otherwise target lines are drawn only at the end of 5 minute turns.
Cell C36	Label epsilon. Normally 1000. Adjusts position of labels.
Cell C37	Smoke from visible ships. Normally 1 to plot ships making funnel smoke as gray lines. See cell menu.
Cell C39-C43	Extend plot (yards). Normally all 2000. Used to extend plot edges.
Cell C44	Intersection epsilon. Normally 0.0200. Do not adjust.
Cell C45	Ship name length. Normally 0 to use full names, otherwise sets the maximum characters to display.
Cell C46	Visible ships. Normally 0. See cell menu.
Cell C47	Blank plot. Normally 0. See cell menu.
Cell C48	Output pdf files. Normally 0. See cell comment.
Cell C49	Smoke from contacts. Normally 1. See cell menu.
Cell C50-C51	Top and Left offsets. Normally 3000 and 0. Adjusts plot top and left offsets.
Cell C52	Draw only in scale. Normally 1 to plot only in plot scale.
Cell C53	Skip Op start positions. Normally 1 unless operational turns are to be plotted. (Operational turns are not completely implemented in the game spreadsheet)
Cell C54	Plot visible from. Normally 0, otherwise plot only what is visible from ship number entered (from column A of the Data sheet).
Cell C55	Reverse ship order. Normally 0. Do not adjust.
Cell C56	Scale on filtered ships. Normally 1 to scale plot based only on ships selected for plotting.
Cell C57	Scale on start/end. Normally 0 to scale plot on all data.
Cell F14	Selected data time point. Used for diagnostics on Data sheet.

Cell F15	Label Y offset. Normally 170. Adjusts label north/south offset.
Cell F16	Initial Positions Scale. Not currently used.
Cell F17	Letter Height. Normally 8.
Cell F18	pdf file font size. Normally 8.
Cell F47	Old text in gray. Normally 1 to print labels in gray except for the last point.
Cell F48	Running animation. Normally 0. See cell menu.
Cell F49	Smoke report persistence. Normally 99. See cell comment.
Cell F50	Use short names. Normally 0 to use full names.
Cell F51	Arrowheads. Normally 1 for dots on labeled points.
Cell F52	Output pdf file last turns. Normally 0. See cell menu.
Cell F53	Plot player(s) recent. Normally 0. See cell menu.
Cell I16	Unit/ship/number. Normally 0 for ship names. See cell menu.
Cell I17	Gunnery log files. See Section 4.3.
Cell J35	Grid spacing. Normally 10 (nautical miles).
Cell J36	Grid with plot. Normally 1 to draw grid.

4.3 Gunnery Logs

The ‘Gunnery Logs’ button on the Buttons sheet will allow selection of a gunnery data file created by the game spreadsheet. The macro will automatically create gunnery logs and hit logs as text files and optionally, as two pdf files (Gunnery Logs.pdf and Hit Logs.pdf) in the directory where the gunnery data file was selected. See Section 1.3 for file locations.

Options for logs are selected using yellow cells on the Button sheet.

Cell I17	Gunnery log files. Normally 1 to combine all ship files into the two pdf files. Otherwise only text files are created.