ERGO blue™

INSTRUCTIONS

ADS™
AERONAUTICAL DATA SYSTEMS, INC.

SET UP

1) Download **ERGO BLUE** from the App store.

2) Using either Wi-Fi or cellular data, open the ERGO BLUE iPad app using login credentials provided by Aeronautical Data Systems (ADS). This will open the Coast out/Coast in Airports entry data window.

3) Enter the aircraft registration number. This is needed to for correct identification in the automatic distress call.

4) The next two data entries require a four-letter ICAO airport identification code to be used to determine the ship display region. Select the blue index icons to open a drop-down menu with airports listed in alphabetical order.

5) Enter the total number of people on board the aircraft. This information would be included in the automatic distress call for search and rescue efforts.
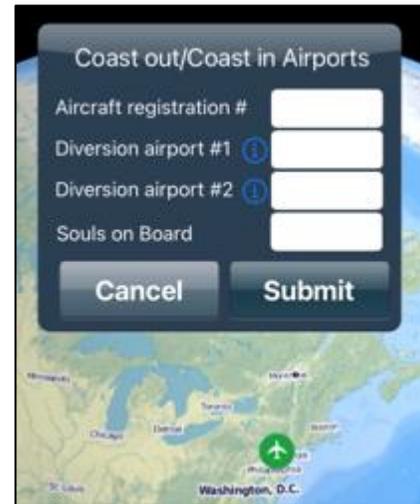
MENU

The ERGO BLUE menu options are located at the bottom of the display (Figure 1):

Figure 1

SHIP REGION

Selecting the **Ship Region** tab will open the Coast out/Coast in data entry window where new airports can be entered. Clicking the submit button and then clicking the vessel tab along the bottom menu will display the new selection.

AIRPORTS

The airports tab is simply an on/off button which can be used to view airports contained in the database. Airport icons are displayed in three colors, based on the longest runway listed at that airport. **Red** icons indicate the longest runway at that airport is less than 3000 feet. **Blue** icons mean the longest runway at that airport is between 3000 feet and 6000 feet long. **Green** icons represent airports with a least one runway greater than 6000 feet in length. This is to help the pilot make a quick decision during emergency situations.
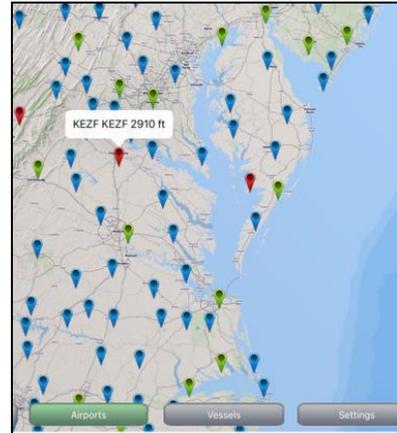

Figure 2

VESSELS

The Vessels tab is simply an on/off button which can be used to display ships in the region. (Figure 2) Two settings are available: Internet and Predicted. These are selected in the Settings tab. (Figure 4) The **Internet** mode displays the reported positions of the ships, shown with blue icons. The **Predicted** mode displays the ships as purple or magenta in color. The predicted mode uses the last reported ship position (UTC time) as well as the last track and velocity to calculate a new Latitude/Longitude, a new distance from the aircraft to the ship and also displays the ship icon on the iPad with a new map position. This is an important feature since the aircraft icon is moving in real time and this updated position will provide a more accurate map display. Knowing how and when to use the Predicted mode is a very important feature to utilize during an emergency.

Touching the vessel/ship icon will open an information banner specific to that ship. The information banner displays:

Figure 3

- **The last UTC time the ship reported its position.** Ships can report anytime, so the time of the last report is important to know (especially if the pilot is intending to use this ship as a point of rescue).

  For example, if a ship has not updated its position in 10 hours and the ship is traveling 10kts/hour, it is conceivably 100 miles from the position displayed on the iPad app. Conversely, a ship that update one hour ago is only 10 miles from the displayed position. The good news is most deep-water vessels travel in a relatively stable heading.

- The next sequential data in the ship banner is the **type of ship** (e.g., tanker, cargo, military, cruise, pleasure). This can be important to know when selecting a ship to use for a water landing/rescue operation since each type will have its own set of advantages/disadvantages.

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- Next is the **name of the ship**. This is also important since the automatic distress voice and data message will identify the ship you have chosen to ditch nearby. Should you wish to communicate with this ship using the handheld marine band radio used to transmit these distress calls you will know the name of the ship to hail.

- The next piece of information is the ship's **last reported course and velocity** used to predict the ship's position. As mentioned, depending on the last time of AIS (ship position) update and ship velocity, it will determine whether using the last internet update or a predicted update will provide the best location and distance information to locate that ship.

- The last data point is the iPad GPS **distance from the aircraft to the ship**. This distance will vary depending on whether the pilot uses the internet mode or predicted mode. The difference between the last reported distance and the predicted distance is explained earlier and is important for the pilot to know how it will affect the AIS display accuracy.

SETTINGS

The settings tab allows user functionality where certain features may be enabled or changed. (Figure 4)

Vessels Mode

The first line is the **Vessels Mode,** where **Internet** or **Predicted** may be selected. **Internet** means that ship locations are getting updated automatically by means of the internet, but the ship position is dependent on how often the vessel reports. Obviously ships move slowly and continuous live streaming of a ship's position is not necessary.

Figure 4

The **Predicted** option disconnects from the internet, changing the ship icons from Blue to Purple. (Figure 5) This mode takes the last time the ship position was updated, then using the course and velocity found under that ship information banner, projects/predicts where that ship should be on the map display. It will also update the latitude and longitude so it can be entered into the aircraft FMS for improved situational awareness and help in visually acquiring a vessel. Predicted mode can be very useful and is also reliable for most ships on great circle routes between ports.
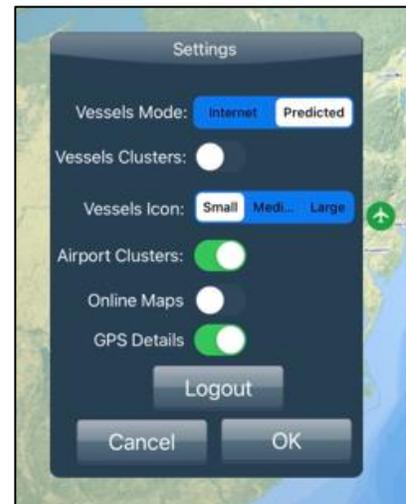

Figure 5

Cluster

Below the Vessels tab are **Cluster** On/Off options for Vessels and Airports. Selecting Clusters in high density areas will condense multiple ships and airports under one colored tab.

Ships are clustered under an orange icon; airports use a light blue icon. The number inside the orange/blue icon represents the number of ships/airports packed under that icon. That number will change as you zoom in and out using the iPad. As you zoom in these icons will begin to unpack and the number inside the icon will decrease. The reverse happens when you zoom out. If you do not wish to use this function simply deselect the Cluster tab to the off position (white).
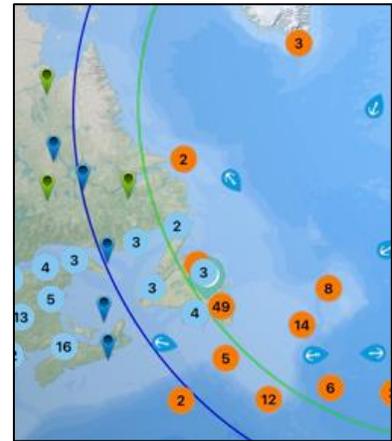

Figure 6

Vessels Icon (size)

The Vessels Icon tab also has a selection to change the size of the ship icon for readability only. The Airports tab does not have this option. Choices are small, medium and large and can be selected by touching on the size you wish to display.

Online Maps

When selected to ON and within internet range, the **Online Maps** option will display a very detailed map when the app is zoomed in. Should the internet fail, mapping will raster and be slow to focus. If online maps are selected off (white button), it will be replaced with another database map (no internet required) which is less detailed but still adequate for geographic display.

GPS Details

This setting is used to ensure the pilot is kept aware of GPS accuracy. A data banner displays GPS information at the bottom of the iPad screen. (Figure 7). This banner will remain black as long as the data inside the banner continues to change indicating the iPad is receiving GPS information.

Figure 7

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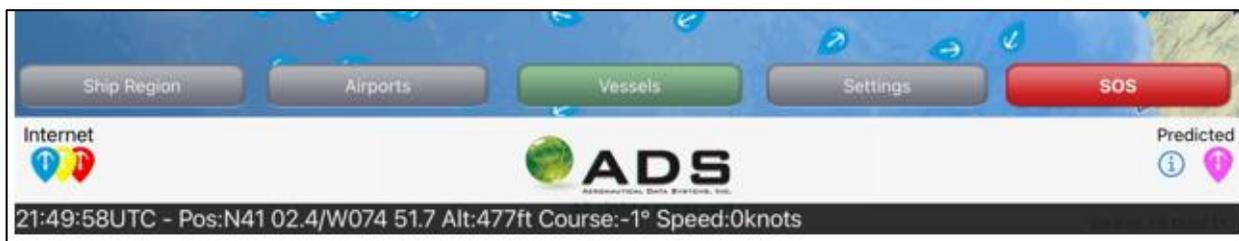
Should the information be unable to update for longer than 2 minutes, the black banner will change to purple, as will the aircraft icon. This is an indication that the iPad is not receiving GPS information.

If the iPad does not receive GPS reception after 8 more minutes (a total of 10 minutes), the purple data banner will turn yellow, as will the aircraft icon. This alerts the pilot that the aircraft position is still not being updated from the iPad GPS and aircraft position may have deviated.

ERGO BLUE will update the aircraft icon as soon as the iPad GPS signal is lost. This can be observed when the black GPS data stops changing but the aircraft icon continues to move its position on the map display. ERGO BLUE will use the last reported course and velocity found in the GPS data banner. Providing the aircraft does not make any turns the aircraft icon should provide a reasonably accurate aircraft position display, but deviation will grow in proportion to time without an update from the iPad GPS. The on/off **GPS Details** button in the **Settings** tab will hide the data banner if desired.

Logout

The **logout** button closes the ERGO BLUE app and logs out the user. When the app is opened again, the login page will be displayed and not the Coast out/Coast in Airports page. The user will have t log back into ERGO BLUE.

SOS

The SOS button is designed to be used in an emergency in conjunction with a handheld marine band radio connected to the iPad using an audio cable. If the cable is not connected to the radio, the SOS portion of this app (the distress call) will not transmit.

To familiarize oneself with the operation of the SOS, the pilot can take these steps <u>without</u> the radio connected. In an actual emergency, the radio must be connected to the iPad

Selecting the red *SOS button* will open a message window confirming that a distress message should be sent. It should be assumed that prior to this the Captain has decided that ditching the aircraft is the only viable option left for him and his crew and passengers to survive.

Once the Captain confirms the message and the (DSC) data frequency is correct, select OK.

A data (text) message will be sent to the bridge of all ships within VHF range and will sound an alarm on the same bridge radio that must be silenced manually by a crew member. (If you are testing the iPad app without the radio and cable you will hear a sound similar to that of sending a fax.) If the message is sent in real conditions, a transmitting icon will appear in the white lower banner indicating the message is being transmitted. Crews can become familiar with what they can expect to see if the audio cable is plugged into the iPad microphone port but is left unconnected to the radio.*
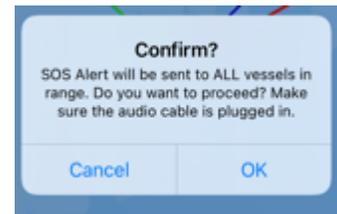
Once the OK button is pressed, the message will transmit and the display will reduce to a 200nm view to display all vessels and airports within that area. The pilot then selects a ship they believe is best suited for their ditching needs by touching that ship's icon. This will open up an information banner for the pilot

to review. If the vessel is still acceptable, another message will inform the crew of the ship they have chosen to ditch by. If the ship is unacceptable, press the cancel button on the popup message and select another ship.

If the ship is acceptable to use in the ditching, then press the OK button. If the cable is not plugged in the crew will hear a computer-generated voice distress call written in the maritime vernacular that will be broadcasted to all ships in voice VHF range. It is good to listen to the message so you will know what is being sent for training purposes only. Once the crew starts sending the voice distress message, the process will repeat itself automatically every 2.5 minutes with updated information (e.g. position, altitude, airspeed, time to a water landing, etc) without further input from the crew. The voice messages will continue until the app is shut down, or the iPad stops working. This process can be accomplished in less than 8 seconds allowing the crew maximum time to manage all SOP and emergency procedures.

Remember that in an actual emergency with the radio plugged into the iPad and the marine band radio selected to the maritime emergency frequency (Channel 16), you will not hear any transmission but will see the same transmitting icon that was viewed for the data transmission. You will also be able to

hear incoming calls on channel 16. Should you hear your call sign and want to speak directly to that ship you must unplug the audio cable to transmit through the handheld radio. If you leave the audio cable plugged into the handheld radio you will not be sending any transmissions.

*Transmission of data messages is pending FCC approval. In the meantime, ADS has developed this procedure which transmits the voice message.

OPERATIONAL CONSIDERATIONS

WEATHER RADAR
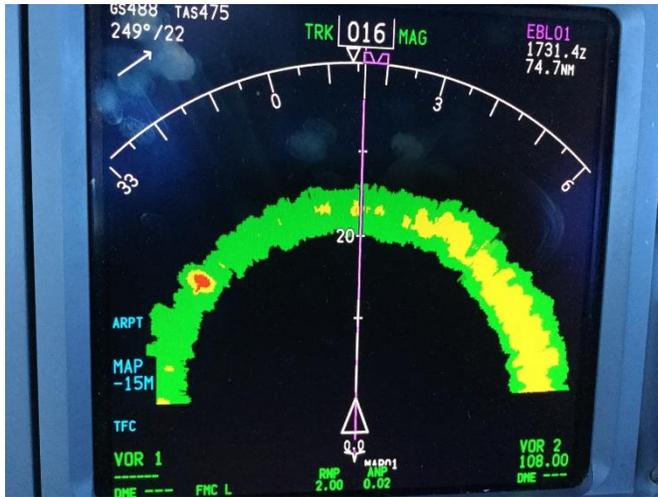
Understanding and using AIS data is relatively new to the aviation industry. It will take some time to realize all the benefits this technology provides. Currently, using AIS data is similar to using weather data in that the information received prior to departure is planned information. Live streaming of AIS information is not practical, nor currently available. Once airborne, technology is available for real time feedback using the weather radar. Most weather radar can be used to paint ships on the open water.

This is a learned technique and can be quite useful in confirming the AIS information is accurate. Developing this procedure to validate ship position can help in maneuvering the aircraft to an optimal position to plan for the shortest exposure time in the water, thus increasing the survivability of a water landing.

It significantly expands the ditching envelope from day VFR to ditching at night or in low visibility or low ceiling conditions without ever having to visually acquire the ship. ERGO BLUE can help reduce pilot task saturation and improve situational awareness, while at the same time aiding rescue efforts and improving survivability.

Some radar manufacturers are beginning to provide ship displays as an added option.

Instrument Approach to a Ditching
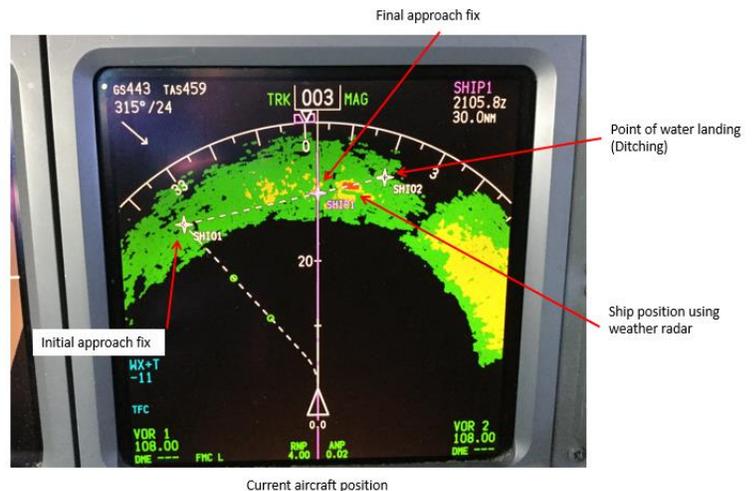
AIRCRAFT/APP CONNECTIVITY

Understanding what visual display has been created on the iPad screen is essential to making the best decision during an emergency. If the visual iPad display does not correctly characterize the actual situation, it should not be used in the decision-making process.

Knowing how each app is designed to work and knowing the limitations are very important especially if the application is designed to be used under aircraft emergency conditions. The internet is a great example. The internet can provide seamless updates using a variety of data sources to provide app continuity. It's only when the internet is not available -- quite often in an emergency -- that the user becomes aware or notices these limitations.

Aircraft design and architecture can also affect the iPad GPS reception inside the cockpit. This should be thoroughly tested and vetted when using any app. Window size, window material, and iPad location mounts are a few examples of specifications that will affect GPS connectivity. Knowing how often the iPad GPS signal is lost will determine if using an external GPS is necessary. Knowing the capabilities and operation of the external GPS in conjunction with ERGO BLUE are equally important.

Should the external GPS fail, what resources for that application are still available? Does the app have any stand-alone capabilities? Most importantly, is the display valid or just a source of confusion?

ERGO BLUE uses color coding (aircraft and ships) to alert the pilot of any failures and levels of app degradation. The aircraft icon is green if the iPad is generating a reliable GPS signal. There is a black data banner at the bottom of the iPad displaying tabulated GPS information. If the iPad GPS signal is lost for longer than 2 minutes, the aircraft icon and the GPS data banner turn purple and the aircraft icon continues to update a predicted position on the iPad mapping program using the last known GPS course and velocity. After 8 more minutes (total of 10 minutes without a reliable iPad GPS signal) the aircraft icon and the GPS data banner turn yellow, warning the pilot that the ERGO BLUE aircraft icon continues to update its position using only a course and velocity. Making any aircraft heading changes will decrease position accuracy.

HANDHELD RADIO TRANSMISSIONS

One must also know the capabilities a handheld marine band radio in flight for emergency transmissions. Aircraft architecture, radio antenna design and operation can all affect voice and data transmission distances. These factors could determine which ship is optimal for a water landing. Knowing how far you can transmit from the cockpit at high altitudes again may vary from aircraft to aircraft and should be determined and incorporated into a ditching SMS protocol.

HIGH ALTITUDE VISUAL ACQUISITION

Another technique that should be practiced as part of emergency training is visually acquiring a vessel at high altitude. Trying to locate a ship in open water at high altitude can be challenging even in good visibility. Using other assets in the aircraft such as AIS data display along with the aircraft FMS map and weather radar can be helpful, but there are additional methods that may be employed. For example, learn where to look in the windscreen using altitude and ship distance. Using the sun and time of day, shadows and looking on the water for ship wakes are a few techniques that can help pick out a ship from high altitude. This is something almost never practiced but will significantly improve ship-finding skills.

END