

Charts+ iOS

User and Compliance Manual

RECORD OF REVISIONS

Issue	Date	Page(s)	Reasons for revisions
1.0	05/10/2017	All	Charts+_IOS_UCM_16001
2.0	30/06/2019	All	Revision of document to reflect: <ul style="list-style-type: none"> - new user interface to enter the flight route and access to terminal charts - changed NAVBLUE processes for the provision of application related information to customers - compliance matrix FAA AC 120-76D - Update based on AMC 20-25 transposition into regulation (EU) 965/2012 (EASA Air Ops regulation)
3.0	09/05/2019	Chapter 3, 4.2, 4.3, 6.5, 9.1.5.2, 10.2.1 & 10.4	Revision of document to reflect: <ul style="list-style-type: none"> - §3 : new HMI in regards to version 19.1 - §4.2 & 4.3 : Display of ownship position inflight - §6.5 : New setting recommendation with added feature in version 19.1. - §9.1.5.2 : adding risk assessment for ownship position. - §10.2.1 : explanation of minor changes. - 10.4 : compliance matrix with Air Ops regulations. - Removal of AMC 20-25 references.

TABLE OF CONTENTS

1. INTRODUCTION	6
1.1 PURPOSE OF THIS MANUAL	6
1.2 APPLICABILITY	6
1.3 DEFINITIONS	7
1.4 GLOSSARY	8
1.5 REFERENCES	10
2. DESCRIPTION OF THE SOFTWARE	11
2.1 OBJECTIVE	11
2.2 FUNCTIONS	11
2.3 INPUT PARAMETERS	13
2.4 OUTPUT PARAMETERS	14
3. HMI CONSIDERATIONS	15
3.1 USE OF COLORS	16
3.2 DATA ENTRY SCREENING AND ERROR MESSAGES	16
3.3 APPLICATION RESPONSIVENESS	16
3.4 OFF-SCREEN CONTENT	16
3.5 ACTIVE REGIONS	17
3.6 INDICATION OF OPEN DOCUMENTS	17
4. ENVIRONMENT OF USE OF THE CHARTS+ IOS APPLICATION	18
4.1 HARDWARE CONSIDERATIONS	18
4.2 GEOGRAPHICAL POSITION SOURCE	18
4.3 DISPLAY OF OWSNHIP POSITION INFLIGHT	18
5. VERIFICATION & VALIDATION	24

© NAVBLUE LTD, 2018. All rights reserved. Confidential and proprietary document. This document and all information contained herein is the sole property of NAVBLUE LTD. No intellectual property rights are granted by the delivery of this document or the disclosure of its content. This document shall not be reproduced or disclosed to a third party without the express written consent of NAVBLUE LTD. This document and its content shall not be used for any purpose other than that for which it is supplied.

5.1	CHARTS+ IOS SOFTWARE	26
5.2	CHARTS+ IOS DATA	27
6.	ADMINISTRATION CONSIDERATIONS	28
6.1	ROLES	28
6.2	OPERATING SYSTEM UPDATES	29
6.3	NON-EFB SOFTWARE APPLICATION	29
6.4	WORKFLOW	31
6.5	RECOMMENDATIONS FOR HMI CUSTOMIZATION	41
7.	FLIGHT CREW PROCEDURES AND TRAINING RECOMMENDATIONS	46
7.1	PROCEDURES RECOMMENDATIONS	46
7.2	TRAINING RECOMMENDATIONS	46
8.	SECURITY CONSIDERATIONS	49
9.	RISK ASSESSMENT AND DISPATCH CONSIDERATIONS	49
9.1	RISK ASSESSMENT	49
9.2	DISPATCH CONSIDERATIONS	55
10.	OPERATIONAL APPROVAL/AUTHORIZATION CONSIDERATIONS	56
10.1	CONTINUED VALIDITY OF THE OPERATIONAL SUITABILITY OF CHARTS+ IOS	56
10.2	MANAGEMENT OF CHANGES TO CHARTS+ IOS BY THE OPERATOR AND ITS NAA	57
10.3	IN-SERVICE FEEDBACK PROCESS	58
10.4	COMPLIANCE MATRIX WITH REGULATION (EU) 965/2012 ON AIR OPERATIONS	60
10.5	COMPLIANCE MATRIX WITH FAA AC120-76D	71

TABLE OF FIGURES

Figure 1: Enroute (Home) screen populated with departure, arrival, alternate and route parameters (left) and with own-ship position in Track up mode (right).....	15
Figure 2: Charts Screen	15
Figure 3: Document Screen, document tree view	15
Figure 4: Busy Icon	16
Figure 5: Position feed HIGH/LOW Accuracy Threshold selection in ENROUTE application settings	18
Figure 6: Position feed loss timeout interval selection in ENROUTE application settings	19
Figure 7: Position and Track availability depiction in “MAP” tile	20
Figure 8: Pop-up message in case of Loss of position feed in either Track Up or North Up mode	21
Figure 9: Position information quality depiction in “MAP” tile	22
Figure 10: Own-ship position indication in Track-Up mode	22
Figure 11: Own-ship position and orientation indication in North-Up mode	22
Figure 12: North Arrow and MAP tile indication in North-Up and Track-Up mode	23
Figure 13: Application data status indication and available update menu with details regarding application data currency	25
Figure 14: Application data status indication and available update menu with details regarding application data currency	25
Figure 13: Charts+ IOS Application Update Process	31
Figure 14: Charts+ IOS data update (Manual)	35
Figure 15: Charts+ IOS data update (Automatic)	38
Figure 18: Charts+ iOS User settings	41

1. INTRODUCTION

1.1 PURPOSE OF THIS MANUAL

This manual provides considerations for the operation and administration of the Charts+ iOS application. These considerations were identified by NAVBLUE and/or by the European Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA) during the operational evaluation of the application. Implementation of these considerations by the Charts+ iOS Operators contributes to an efficient operation with this EFB application.

This manual provides elements that may be used by the Charts+ iOS Operators for the compliance demonstration with the EFB regulatory materials of the EASA, the FAA or any other National Aviation Authority (NAA). This manual considers the EASA and FAA EFB regulatory considerations for which compliance elements specific to the Charts+ iOS application were identified. These compliance elements are summarized in section 10. The compliance elements provided in this manual should be tailored and completed as needed in accordance with the Operator's own EFB configuration, operations, and policy. The Operator remains responsible for the demonstration of compliance with the EFB requirements and guidance of their National Aviation Authority.

The manual does not substitute for, or prevail over, any of the terms of the NAVBLUE Charts+ or Customer Information Manager statement of work (SOW) or the Apple hardware and software Product agreements. The Operator must read the SOW and take responsibility to accept the different agreements prior to using the Charts+ iOS application.

This manual will be updated as necessary in case of changes to the Charts+ iOS application, in-service feedback, EASA, FAA, or other Aviation Authority requests, or any other valid reasons (e.g. corrections).

1.2 APPLICABILITY

This manual is applicable to the Charts+ iOS application used on portable EFB.

The release note, attached to each Charts+ iOS application version, specifies the applicable version of the present manual.

1.3 DEFINITIONS

The terminology used in this manual is adapted to the level of compliance expected from the operators:

- 'Should' is used to specify considerations identified as necessary to show compliance with EFB regulatory guidance (e.g. Regulation (EU) 965/2012 on air operations or FAA AC 120-76). Implementation by the operators of these considerations is expected.
- 'Can, 'May' or 'Recommended' is used to provide additional considerations for efficient Charts+ iOS operations. Implementation by the operators of these considerations is recommended.

1.4 GLOSSARY

AD`	Aerodrome
AID	Aircraft Interface Device
ALTN	Alternate
ANF	Airport Navigation Function
ARR	Arrival
COTS	Commercial Off-The-Shelf
CRC	Cyclic Redundancy Check
DB	DataBase
DEP	Departure
DQR	Data Quality Requirements
EASA	European Aviation Safety Agency
EFB	Electronic Flight Bag
ENC	Enroute Chart
ERA	Enroute Alternate
FAA	Federal Aviation Administration
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HMI	Human Machine Interface
MDM	Mobile Device Management
NAA	National Aviation Authorities
NCIM	NAVBLUE Customer Information Manager
OANS	On-board Airport Navigation System
PED	Portable Electronic Device
RWY	Runway



SDLC	System Development life cycle
SOP	Standard Operating Procedure
STS	Status
SUA	Special use Airspace

1.5 REFERENCES

Ref.	Doc. Reference	Author(s)
[REF.1]	Manual Charts+ iOS	NAVBLUE
[REF.2]	Charts+ Information Manager Help Guide	NAVBLUE

2. DESCRIPTION OF THE SOFTWARE

This section describes the Charts+ iOS software functionalities and capabilities.

2.1 OBJECTIVE

Charts+ iOS is a chart and document viewing application for iOS devices. It is comprised of the enroute map, the Terminal Charts, Clipboard and the Document Viewer. It is designed to provide flight crew with quick and easy access to navigational documents and information (terminal charts, enroute map, route guide, company documents) required for their operations.

2.2 FUNCTIONS

The following functions are provided by the Charts+ iOS application:

- General:
 - Data/charts currency display
 - Availability of content update packages for download
 - Content details of downloaded update packages
 - Application version display
 - Application settings
 - Day and night mode options
- Route Entry:
 - Route definition based on departure (FROM), arrival (TO), alternate (ALTN) aerodromes and runway selection and route defining waypoints, nav aids and airways entry
 - Route reversal option
- Terminal charts (based on the customer's subscription):
 - Quick access to terminal charts through chart screen and clipboard
 - EFB administrator controlled preferred terminal chart selection (optional)
 - Terminal chart Sketch and annotation function
 - Terminal chart printing

-
- AIRAC effective date & time behavior
 - Seamless worldwide enroute map:
 - Enroute map search capabilities
 - Enroute map double tap functionality for feature information
 - Enroute map search functionality to search for specific aeronautical features
 - Control over visibility of Enroute data types and high/low airspace data types
 - Enroute Communication information
 - Enroute map scale information
 - Optional moving map (map centered North up or Track up with or without own-ship position depiction) and closest Enroute alternate indication
 - AIRAC effective date & time behavior
 - Route Guide information:
 - Aeronautical information in text format with worldwide, regional or country-specific applicability
 - Search for specific terms
 - Bookmark specific pages
 - Add specific pages to clipboard
 - AIRAC effective date & time behavior
 - Customer documents:
 - General documents accessible through the document viewer
 - Airport specific documents accessible from the Charts workspace and document viewer
 - Search for specific terms
 - Indication of availability of new documents
 - Bookmark specific pages
 - Add specific pages to clipboard
 - Effective date & time behavior (optional)

2.3 INPUT PARAMETERS

The basic input parameters for the Charts+ iOS application are:

- Route information
 - Departure (FROM), Arrival (TO) and Alternate (ALTN) airports
- Application settings applicable while using the application
 - User authentication information
 - Subscription information to identify the user's aeronautical information coverage

The advanced input parameters for the Charts+ iOS application are:

- Route information
 - Route definition (waypoints, nav aids, airways defining the route)
- Application settings applicable while using the application
 - General, route, terminal charts, enroute map, document viewer settings
- Aircraft positioning information from device integrated GNSS sensors and position solution or external portable GNSS sensor for an optional enroute moving map function with or without own-ship position depiction (as enroute moving map only, own-ship depiction is not supported on terminal charts).
 - a. Aircraft position (Latitude and Longitude)
 - b. Aircraft course information
 - c. Position accuracy

The basic input parameters for the Charts+ Information Manager (NCIM) ground tool are:

- Customer Documents
 - Aerodrome specific customer documents
 - Customer reference documents (not aerodrome specific)
 - Effective date and time for customer documents (optional)

2.4 OUTPUT PARAMETERS

The application outputs are:

- The display of timeliness of aeronautical information available within the application.
- The display of a worldwide seamless enroute map with an optional enroute moving map function with or without own-ship depiction.
- The display of position information availability and accuracy.
- The display of terminal charts and route guide text pages for the relevant airports and area of operations as specified by the customer.
- The display of customer documents
- The display of route specific information in the enroute map.

The basic output parameters for every device to the Charts+ Information Manager (NCIM) ground tool are:

- Device update status
- User Name
- Device Name
- Subscription Name
- Package name of last downloaded package
- Last revision and deployment date
- Aeronautical information timelines status
- Device model number
- Operating system version
- Charts+ iOS application version

3. HMI CONSIDERATIONS

The Charts+ iOS HMI has been designed using flight deck as well as operators' and users input. It has been undergone multiple Human Factor Trials with small, medium and large operators worldwide.



Figure 1: Enroute (Home) screen populated with departure, arrival, alternate and route parameters (left) and with own-ship position in Track up mode (right)

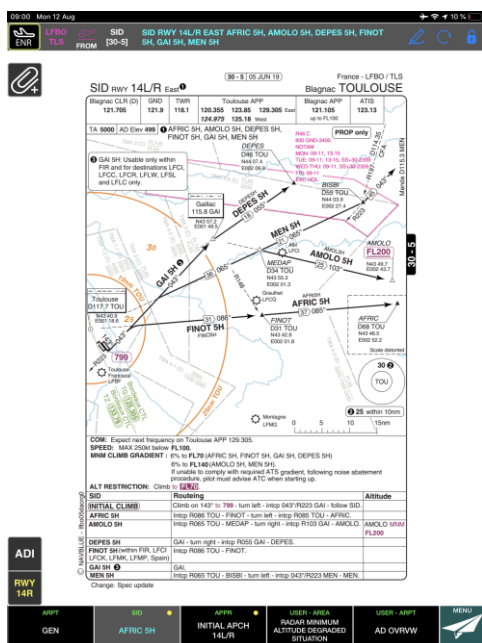


Figure 2: Charts Screen

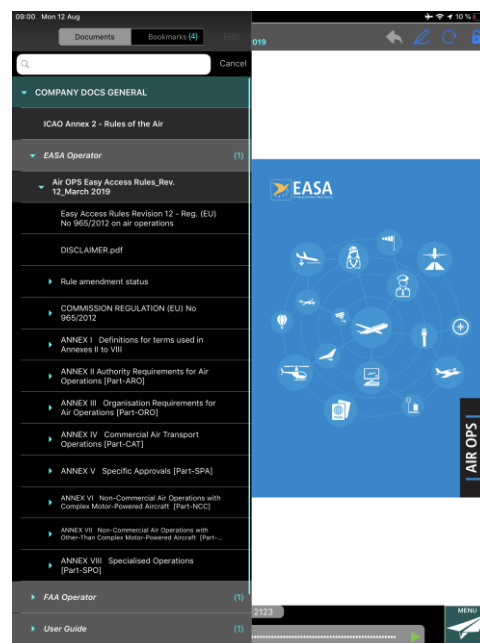


Figure 3: Document Screen, document tree view

Charts+ iOS is designed for use on iPad with 9.7 inch displays or larger. HMI design to assure legibility is based on a max. viewing distance of approx. 1m.

3.1 USE OF COLORS

Charts+ iOS content display has two color schemes when viewing Terminal Charts, Documents and the Enroute Map. These are “Night mode” and “Day mode”.

The “Night mode” functionality reduces glare during operations in low light conditions and the application will be set by default to this mode when first opened if that option is selected to prevent unwanted glare from the device.

The HMI color scheme follows the same rules to indicate the status and availability of functions in all the application’s workspaces.

3.2 DATA ENTRY SCREENING AND ERROR MESSAGES

User entered data is checked for correctness in the context of its input. In case of incorrect input, visual feedback is provided to the user, applying a consistent color-coding and message scheme, or by specific HMI behavior.

3.3 APPLICATION RESPONSIVENESS

The application provides clear and unambiguous feedback to the user to indicate when user input is accepted.

The responsiveness for the display of data-driven enroute maps is dependent on device specifications. It is recommended to follow the hardware requirements as specified in [REF 1.] (Manual Charts+ iOS) to achieve optimal application response times.

A system busy icon is displayed whenever immediate application response is not possible due to background processes (i.e. when loading enroute map information).



Figure 4: Busy Icon

Visual touch activation feedback is provided.

3.4 OFF-SCREEN CONTENT

Off-screen content is indicated by consistently applying “scroll bar” indication of the visible content of information versus the overall content of information. For documents and terminal charts, the

documents are depicted as fit-to-screen when opened. After zooming and panning user actions, the off-screen indication is easily derived by visible recognition of the partially displayed document. For all document type of data (terminal charts, documents), the default fit-to-screen position can be easily accessed.

3.5 ACTIVE REGIONS

Active regions are clearly indicated by user interface design.

3.6 INDICATION OF OPEN DOCUMENTS

The application provide continuous indication of which document is active.

When the user brings and application that was previously running in the background back to foreground, it appears in the same state as when the user left the application.

When the user opens the application after it has been terminated manually, the user has the option to restore the previous application state prior to terminating.

4. ENVIRONMENT OF USE OF THE CHARTS+ IOS APPLICATION

This section provides considerations related to the environment of use of the Charts+ iOS application, for example the EFB hardware hosting the Charts+ iOS application, the position information source, or any other applicable considerations.

4.1 HARDWARE CONSIDERATIONS

There is no specific consideration on the environment of use of the Charts+ iOS application, like recommendations related to the EFB hardware, other than the ones required by

- The NAVBLUE iOS Charts+ release note and
- The EFB regulations (where the hardware compliance remains under operator's responsibility).

4.2 GEOGRAPHICAL POSITION SOURCE

The Charts+ iOS application accepts the following positioning data sources for enroute moving map functionality with own-ship position indication:

- iPad device internal GNSS position data source
- External COTS GNSS position receiver

To determine the validity of position information, the continuous availability of position information is monitored based on user selectable loss-of position-feed monitoring settings. Any enroute moving map function will be terminated if the continuous availability of the position information doesn't match the user-selectable time (3, 5, 10 or 30 sec) defined as a monitoring criterion.

4.3 DISPLAY OF OWSNHIP POSITION INFLIGHT

4.3.1 POSITION SOURCE ACCURACY AND AVAILABILITY

To control the application's Enroute moving map behaviour with respect to position information accuracy, the application will monitor the accuracy parameter provided by the iPad device internal GNSS position data source or the external COTS GNSS position receiver.

The user can select a threshold that is used to determine if an own-ship depiction will be shown on the enroute moving map. Selectable accuracies are 50m, 100m, 500m and 1000m.

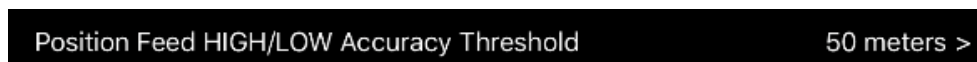


Figure 5: Position feed HIGH/LOW Accuracy Threshold selection in ENROUTE application settings

If the accuracy deteriorates below the defined threshold or if no accuracy value is provided by the position data source, the enroute moving map will still operate, but the own-ship depiction will be removed.

Note: *The selection of the appropriate accuracy for Enroute Moving Map functionalities with own-ship depiction has to consider the operator's national aviation authority's regulatory requirements.*

To control the application's Enroute moving map behaviour with respect to position information availability, a timer will revert MAP Track Up or North Up enroute moving map mode to non-enroute moving map PAN mode based on a user-configurable defined "time of no valid position feed". Selectable intervals are 3, 5, 10 or 30 seconds.

Note: *The selection of the appropriate time interval has to consider the operator's national aviation authority's regulatory requirements.*

The timer will start when there no position data is made available to the application. It prevents frequent switches between a state when valid position feed is available and unavailable.

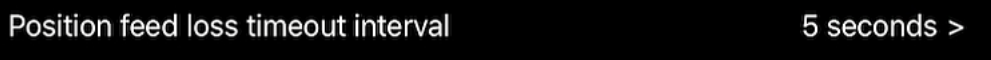


Figure 6: Position feed loss timeout interval selection in ENROUTE application settings

Behavior when losing position data when in enroute moving map Northup or Track Up mode:

If position data are reported as invalid or being lost for an interval longer than the user-selected "time of no valid position feed", the application will revert to PAN (non-moving map) mode.

Behavior when losing track data when in enroute moving map Track Up mode:

If track data are reported as invalid, the application will revert to North-Up moving map mode.

4.3.2 HUMAN MACHINE INTERFACE (HMI)

When the enroute workspace is active (shown), a "MAP" tile is permanently depicted. If the use of the location feed has been activated by the user in iOS Settings ("While Using"), the "MAP" tile indicates the availability of GNSS position and track information:

Within the "MAP" tile, symbols are displayed in the top left-hand corner of the tile identifying position and Track data availability.

The availability of users' choices to select enroute moving map Track-Up or North-Up mode is controlled by the availability of the respective position and track information:


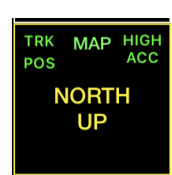
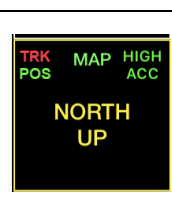

	<p>No tracking symbol shown: GNSS and track feed disabled by user</p> <p><i>Enroute Moving Map in North-Up or Track Up mode is not available.</i></p>
	<p>TRK shown in green: track feed available. POS shown in green: position feed available.</p> <p><i>Enroute Moving Map in Track Up mode with or without own-ship depiction are both available.</i></p>
	<p>TRK shown in red: track feed not available. POS shown in green: position feed available.</p> <p><i>Enroute Moving Map in Track Up mode is not available. North-Up mode is available, but no own-ship position indicating the aircraft's orientation.</i></p>
	<p>POS shown in red: position feed not available. TRK shown in red: track feed not available.</p> <p><i>Enroute Moving Map in North-Up or Track Up mode is not available.</i></p>

Figure 7: Position and Track availability depiction in “MAP” tile

User notification when losing position and course data when in MAP PAN mode:

- If the user loses both "positional and track" data at the same time, the MAP tile will revert to PAN mode with TRK and POS displayed in red.
- If the user loses only “track” data, the Track Up option will be unavailable as a choice on the MAP tile with TRK in red, POS in green. MAP PAN behavior will not be affected.
- If track data becomes available again, then Track Up option will become available again in the MAP tile with TRK (and POS) back in green.

User-notification when losing position feed course data when in North Up mode:

- If the user loses both "positional and course" data at the same time, a pop-up message "Navigation Data Unavailable" will be shown x seconds after the user-selected “position feed loss timeout interval” (x depend on the value set in the setting). The MAP tile will revert to PAN mode, without orange boundary and orange “NORTH UP” title, and with “TRK” and “POS” indicated red.

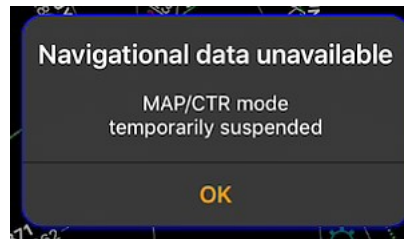


Figure 8: Pop-up message in case of Loss of position feed in either Track Up or North Up mode

- If both position and track data become available again, then the MAP tile will show TRK and POS in green, but the application will remain in MAP PAN mode. The Track Up and North Up options will become available if the MAP tile is selected by the user.
- If the application loses only track data, it will remain in North Up mode, but the Track Up option will be unavailable in the MAP tile with "TRK" indicated in red.
- If track data becomes available again, the Track Up option will become available again in the MAP tile "TRK" indicated in green, but the application will remain in MAP North UP mode. The Track Up option will become available if the MAP tile is selected by the user.

User-notification when losing position feed when in Track Up mode:

- If the application loses both position and track data at the same time, a pop-up message "Navigation Data Unavailable" will be shown x seconds after the user-selected "position feed loss timeout interval" (x depend on the value set in the setting). The MAP tile will revert to PAN mode with "TRK" and "POS" indicated red.
- When both positional and course data become available again, the MAP tile will depict "TRK" and "POS" in green, but the application will remain in MAP PAN mode. The Track Up option will become available if the MAP tile is selected by the user.
- If the user loses only track data, a pop-up message "Course Data Unavailable" will be displayed. The Enroute application will be auto-switched to North Up mode as the Track Up option becomes unavailable. The MAP tile will show "TRK" in red. If track data becomes available again, the application will remain in Northup mode, but "TRK" will be shown in green and the Track Up option will become available if the MAP tile is selected by the user.

Within the "MAP" tile, symbols are displayed in the top right-hand corner of the tile identifying position data quality with respect to the user-selected accuracy threshold (in the Enroute settings):

The availability of users' choices to select enroute moving map Track-Up or North-Up mode is controlled by the availability of the respective position and track information:

Figure 9: Position information quality depiction in “MAP” tile

The Charts+ application allows the use of device-internal or portable COTS position source to enable enroute-moving map functionality in Track-Up mode (with own-ship position depiction) and North-UP mode (with own-ship position and orientation depiction) using the device-internal GNSS or external COTS GNSS position and track information.



PAGE 22 / 79

No other information related to track/heading information, estimated time of arrival (ETA), altitude, geographical coordinates of the current location of the aircraft and aircraft speed is provided.

When enroute moving map mode is enabled (either Track-Up or North-Up mode):

- the North-Arrow symbol will be shown in yellow with a circle around it.
- the “MAP” tile will be shown with an yellow frame, and the selected mode (“North UP” or “TRK Up” depicted in orange) to distinguish the enroute moving map mode from PAN mode.

When enroute moving map mode is enabled and Track-Up mode is selected, the North Arrow will be rotated based on the track information to indicate true north.







PAN Mode (no enroute moving map)	North-Up Mode (enroute moving map)	Track-Up Mode (enroute moving map)
		 Rotated based on track information
		

Figure 12: North Arrow and MAP tile indication in North-Up and Track-Up mode

NOTE: The display of own-ship position in flight as an overlay to other EFB applications should not be used as a primary source of information to fly or navigate the aircraft.

4.3.4 CONTROLS

Charts+ provides continuous indication of the availability of the position and track information (see above section 4.3.2. The user can easily switch between enroute moving map in Track Up and North Up mode and non-enroute moving map enroute data depiction in PAN mode. The availability to select enroute moving map Track-Up or North-Up mode is modal based on the availability of the respective data feeds to the application.

The enroute moving map function can be disabled using the Charts+ settings in the device’s iOS Settings (select “NEVER”), or, if applicable, based on the operator’s Mobile Device Management administration.

5. VERIFICATION & VALIDATION

The Verification and Validation (V&V) process of the Charts+ iOS application includes the following four phase process:

- Phase 1: Charts+ iOS software application
- Phase 2: Charts+ iOS data
- Phase 3: EFB administration
- Phase 4: User

This Quadruple-phase process and data is designed to ensure the integrity and the consistency of the software and the associated data:

- Phase 1 – Charts+ iOS software application

This stage is part of the NAVBLUE development process. It ensures that the software complies with its specifications and its intended functions. It includes a series of tests based on documented test cases at different stages of the coding and testing the general functionality from an operational perspective.

In-addition, non-regression tests ensure consistency with previous versions and full regression testing ensures compatibility with IOS firmware releases and major functionality changes.

- Phase 2 – Charts+ iOS data

This step relies on the NAVBLUE DO-200A process for database generation from data sourcing up to its delivery to each operator.

- Phase 3 – EFB administration

The EFB Administrator that validates the crew devices have the current Data packages and application version using NAVBLUE Customer Information Manager (NCIM)

- Phase 4 – User

The User will identify the currency of the data from within the application by

- viewing the application data currency symbol in the upper right corner of the enroute (Home) screen
- viewing the application data ribbon at the bottom of the route screen in the application.

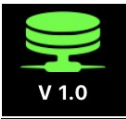


Figure 13: Application data status indication and available update menu with details regarding application data currency

Available Updates	Content Details	User Group	Administration
Revision Status			
	ENROUTE	CHARTS & GUIDE	
ON DEVICE	1908 (2019-07-18)	201933 (2019-08-12)	
EXPECTED	1908 (2019-07-18)	201933 (2019-08-12)	
FUTURE	1909 (2019-08-15)	201934 (2019-08-19)	

NAVBLUE Charts+ iOS Data Download

No packages available

Figure 14: Application data status indication and available update menu with details regarding application data currency

5.1 CHARTS+ IOS SOFTWARE

Charts+ iOS is developed using Objective C on the Apple iOS platform meant for use on the Apple iPad.

The app is developed by NAVBLUE using the documented and quality controlled NAVBLUE Software Development LifeCycle (SDLC) process.

This process uses the “Agile” methodology comprised of multiple iterative internal releases, or ‘sprints’, to develop new software functionality and/or address any issues.

Charts+ iOS is deployed through a customer’s mobile device management system (MDM) or the Apple App Store. The latter requires a software release by NAVBLUE be submitted to Apple, approved by Apple, then released on the Store.

Customers are then notified that an app update is available and can download and install the update directly from the iPad device.

NAVBLUE advises customers to establish a corporate policy on app updates for their iPads to maintain a consistent EFB version control in their operations. Customers may alternatively deploy Charts+ iOS through their own internal Mobile Device Management (MDM) infrastructure, providing them with greater control over their corporate app update policy.

5.2 CHARTS+ IOS DATA

5.2.1 V&V - NAVBLUE SIDE

In the Charts+ Data production process, NAVBLUE performs V&V tasks to check the quality of the aeronautical data.

This process relies on two main parts:

- The LOA Type 1 granted by EASA to “Perform Translation, formatting and/or integration of information that originates from state Aeronautical Information Services (e.g. AIP) into electronic databases”.
- A certified Quality management system for the “compilation, amendment production and supply of aeronautical documents, together with their distribution. The translation, format and integration of information that originates from state aeronautical information service for airborne and ground-based navigation systems”. As certified by the British Standards Institution (BSI) in compliance with EN9100:2009 (technical equivalent of AS9100C and JISQ9100:2009) and ISO9100:2008.

5.2.2 V&V - OPERATOR SIDE

Each time the Charts+ application is updated, the operator (the EFB administrator) and user must perform a verification and validation check to ensure the Data Package being used is current (Refer to section 6)

6. ADMINISTRATION CONSIDERATIONS

6.1 ROLES

6.1.1 EFB ADMINISTRATOR

The EFB Administrator role is a principal role in the management of the EFB system. Depending on fleet size, this role may require more than one individual to conduct the EFB administration tasks which includes the administration of the Charts+ iOS software and data. Nevertheless, at least one person should be designated as the EFB Administrator responsible for the whole EFB administration process in front of local aviation authority of the operator.

The EFB Administrator is the person in charge of ensuring that any EFB hardware conforms to the expected specification and that no deviation occurs. He/she is also responsible for ensuring that only the current version of the application and the data packages are installed on the EFB devices of the operator's fleet.

The EFB Administrator is responsible for:

- Installing the EFB applications, including Charts+ iOS.
- Supporting to the EFB users in the use of these applications.
- Managing the security of the EFB devices.
- Managing the configuration of the hardware and software for each EFB device of the fleet
- Ensuring that only valid versions of EFB applications and authorized data packages are installed on EFB devices.
- Ensuring the integrity of the data packages used for EFB operations.
- Defining the customization (display options) of EFB applications, including Charts+ iOS application.
- Defining the EFB version which encompasses the EFB applications version and the data package.
- For each new application version, inform the flight crews of any applicable software limitation and related work around/mitigation as described in the associated Navblue release note.
- Manage miscellaneous EFB software applications.
- Ensure the continuity of the management of the EFB system in the absence of the EFB administrator.

The operator should make arrangements to ensure the continuity of the Charts+ iOS administration process in the absence of the EFB Administrator.

6.1.2 CHART CONTENT ADMINISTRATOR

The operator's Chart Content Administrator is the person in charge of ensuring that any Chart Content conforms to the expected specification and that no deviation occurs. He/she is also responsible for ensuring that only the current version of the Chart content data packages are available for the EFB administrator who is in charge to install them on the EFB devices of the operator's fleet.

The Chart Content Administrator is responsible for:

- Retrieving the Chart Content data used by the operator including the Charts+ iOS Packages (but not restricted to)
- Supporting the EFB Administrator in the use of these Charts+ iOS packages
- Ensuring that only valid versions of Charts+ iOS packages are available for EFB administrator
- Ensuring the compatibility of the Charts+ iOS packages used for EFB operations

The operator should make arrangements to ensure the continuity of the administration process in the absence of the Chart Content Administrator.

As Part of the service offered by NAVBLUE some of the EFB Administrator and Chart Content Administrator tasks can be performed by NAVBLUE Charts Customer Services. This is called "Automatic" mode (See 7.4.3). The Alternative is "Manual mode" (See 7.4.2).

Note: The Chart Content administration shall be performed using the web based Charts+ Information Viewer ground tool that includes extensive Charts content validation, comparison and graphical depiction capabilities.

6.2 OPERATING SYSTEM UPDATES

Any new iOS major version implies an evaluation to verify it has no adverse effect on the application. NAVBLUE verifies Charts+ iOS applications compatibility with major and minor iOS version and will inform the customer about incompatibilities found during the respective compliance testing process.

It is recommended that operators implement administrator procedures to not update their devices to new major releases of iOS until such time as NAVBLUE reports that no compatibility issues remain between the revised OS and Charts+ iOS

6.3 NON-EFB SOFTWARE APPLICATION

The iOS system provides default applications not related to flight operations and allows to easily install additional applications.

These applications are out of the scope of this document. However, it should be reminded that the EFB administrator should ensure that non-EFB software applications do not adversely impact the operation of the EFB.

It is recommended that the EFB administrator inhibits the possibility to install new applications, once the EFB is in the defined software configuration.

6.4 WORKFLOW

6.4.1 CHARTS+ IOS UPDATE

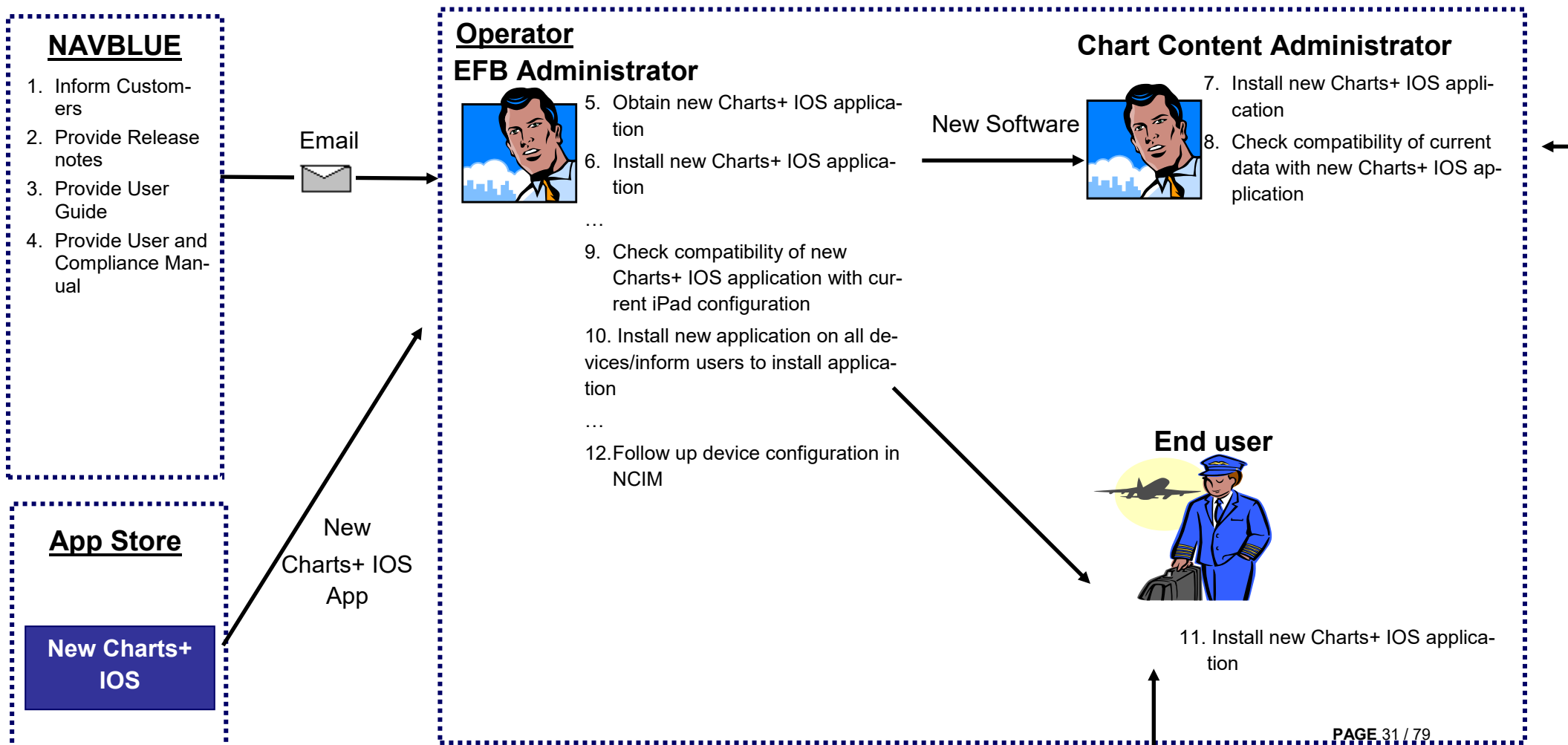


Figure 15: Charts+ IOS Application Update Process

Steps description:

#	Activity	Actors	Tool	Main output	Description
1	Inform customers	NAVBLUE	E-mail	Notification e-mail	The operator EFB Administrator receives an e-mail from NAVBLUE informing the availability of a new version of the Charts+ iOS application.
2	Provide Release notes	NAVBLUE	E-mail	Notification e-mail	The operator's EFB Administrator receives an e-mail from NAVBLUE providing access to the NAVBLUE Academy workspace where he can access the release notes
3	Provide User guides	NAVBLUE	E-mail	Notification e-mail	The operator's EFB Administrator receives an e-mail from NAVBLUE providing access to the NAVBLUE Academy workspace where he can access the user guide
4	Provide access to training information (only in case of large functional changes)	NAVBLUE	E-mail	NAVBLUE academy access	The operator EFB Administrator receives an email providing access to the NAVBLUE Academy workspace where he can access the application-related training material
5	Provide User and Compliance Manual	NAVBLUE	E-mail	Notification e-mail and/or NAVBLUE academy notification	The operator EFB Administrator receives an email providing access to the NAVBLUE Academy workspace where he can access the application-related training material
6	Obtain new Charts+ iOS application	EFB Administrator	APP Store	Charts+ iOS Application	The EFB Administrator locates the Charts+ iOS Application on the APP store

#	Activity	Actors	Tool	Main output	Description
7	Install new Charts+ iOS application	EFB Administrator	App Store	Charts+ iOS application installed on EFB Administration iPad	After reading the documentation sent by NAVBLUE the EFB Administrator installs the new application on an administration iPad
8	Install new Charts+ iOS application	Chart Content administrator	App Store	Charts+ iOS application installed on Chart Content Administration iPad	The EFB Administrator notifies Charts Content Administrator that a new Charts+ iOS application has been released. After reading the documentation sent by NAVBLUE the EFB Administrator installs the new application on an administration iPad
9	Check compatibility of current data with new Charts + IOS application	Chart Content administrator	Charts+ iOS application	Compatibility assessment with current data	The Charts Content Administrator checks the compatibility of the current data with the new Charts+ iOS application
10	Check Compatibility with iPad configuration	EFB Administrator	Administration iPad, NCIM	Compatibility assessment with current iPad setup	The EFB Administrator should use the Release notes and user guide to assess the compatibility of the new application with the current Hardware configurations across the whole end user group. This should consider: <ul style="list-style-type: none"> • Space requirements, • Hardware Performance requirements • Operating system etc....
11	Install across all devices/inform user group	EFB Administrator	App store	Roll out of new Charts+ iOS application	If the iPads are centrally located or come through one central location for updating the EFB Administrator should install the new Charts+ iOS application on all the devices.

#	Activity	Actors	Tool	Main output	Description
					If the iPads are user based the EFB Administrator should notify all users that a new version of the application is available from the APP store, and that it should be installed onto their device.
12	Install application	End User	App store	Roll out of new Charts+ iOS application	On receiving notification from the EFB Administrator the End Users should locate and install the new Charts+ iOS application
13	Follow up device configuration	EFB Administrator	NCIM	Confirm all devices are configured correctly	The EFB Administrator should use NCIM to verify all devices are using the correct version of the Charts+ iOS Application.

6.4.2 CHARTS+ IOS DATA UPDATE (MANUAL)

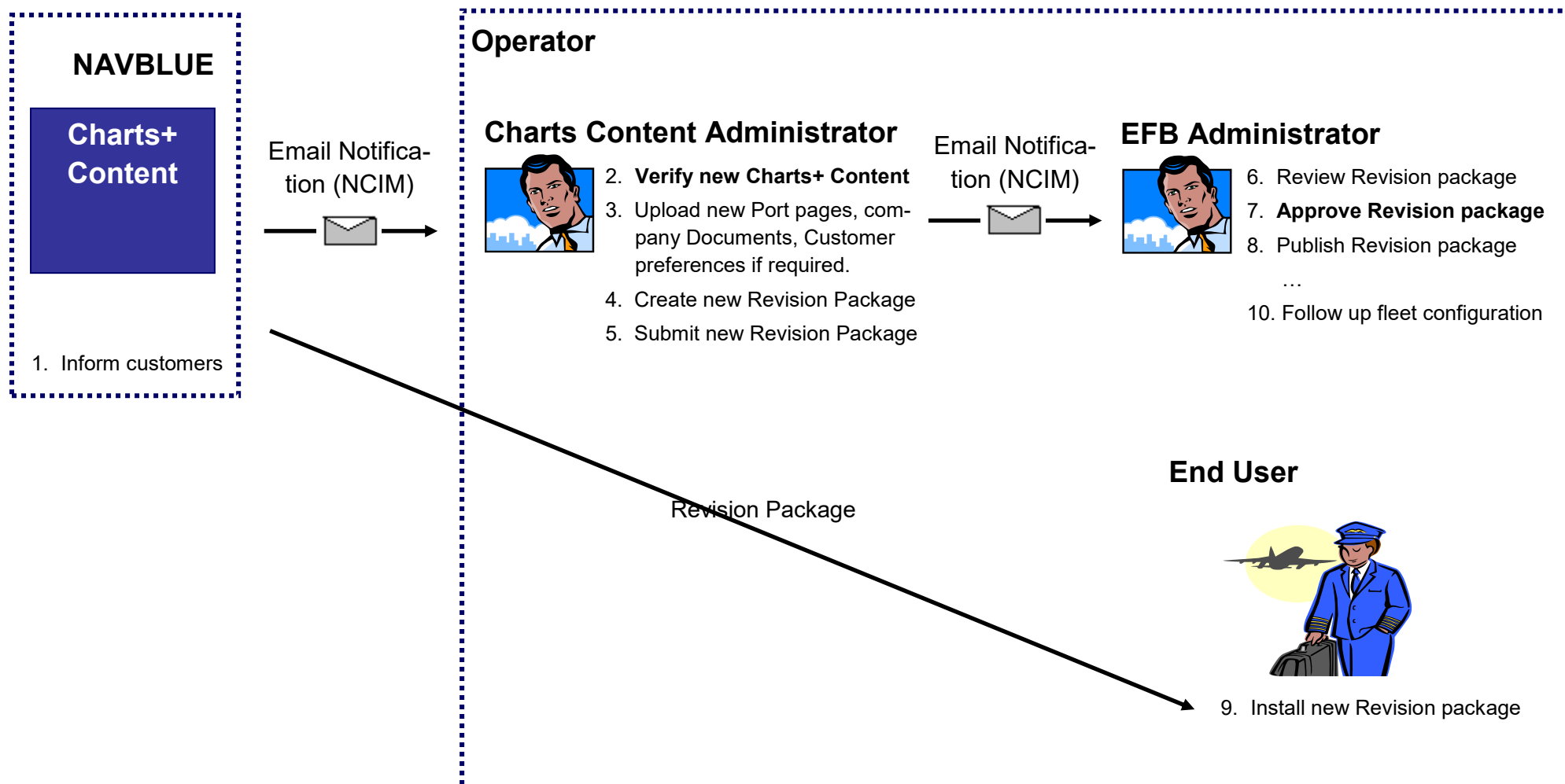


Figure 16: Charts+ IOS data update (Manual)

Step by step description

#	Activity	Actors	Tool	Main output	Description
1	Inform customers	NAVBLUE	E-mail	Notification email	The Charts Content Administrator receives an e-mail from NAVBLUE informing the availability of new Charts Content.
2	Verify Charts+ content	Charts Content Administrator	NCIM	Charts content verified and approved	The Charts Content Administrator review the new charts content
3	Company documentation	Charts Content Administrator	NCIM	Port pages, arrival preferences and company documents available for publication	The Charts Content Administrator will verify any company documentation and preferences against the new Charts content. Any additional items will be added to NCIM
4	Create revision package	Charts Content Administrator	NCIM	Revision package created for submission	The Charts Content Administrator will create the revision package using NCIM. They will include all the Company documentation added and the charts package from NAVBLUE
5	Submit Revision package	Charts Content Administrator	NCIM	Revision package is submitted for approval	The Charts Content Administrator will Submit the package to be reviewed by the EFB Administrator
6	Review revision package	EFB Administrator	NCIM	Verify Revision package is correct	The EFB Administrator will review the content of the revision package.
7	Approve revision package	EFB Administrator	NCIM	Revision package approved	The EFB Administrator will approve the revision package after reviewing

#	Activity	Actors	Tool	Main output	Description
8	Publish Revision package	EFB Administrator	NCIM	Revision package is sent to the End users for install	The EFB Administrator will publish the revision package so that it is sent to the End user devices
9	Install Revision package	END User/ EFB Administrator/ Charts content administrator	Charts+ application	New charts data available on devices	The End User will be prompted that there is a new revision package to download when they first open the Charts+ iOS application. They will then download this revision package on the device through the application
10	Follow-up fleet configuration	EFB Administrator	NCIM	Traceability of the EFB data	The EFB Administrator will verify in NCIM that all users have installed the latest package

6.4.3 CHARTS+ IOS DATA UPDATE (AUTOMATIC)

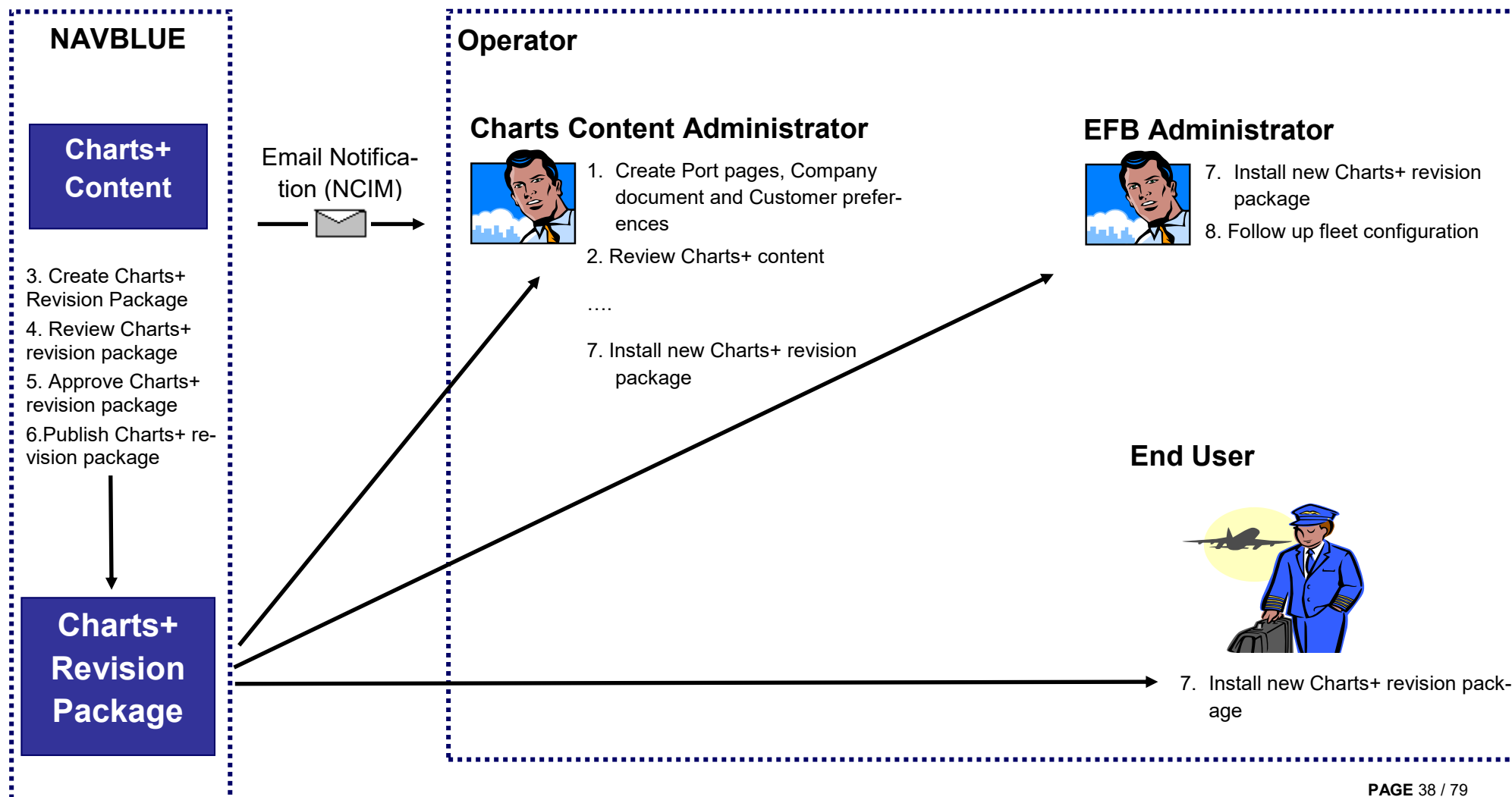


Figure 17: Charts+ IOS data update (Automatic)

Step by step description

#	Activity	Actors	Tool	Main output	Description
1	Create Company Documents	Chart Content Administrator	NCIM	Port pages, arrival preferences and company documents available for publication	The Charts Content Administrator will verify any company documentation and preferences against the new Charts content. Any additional items will be added to NCIM
2	Review charts+ content	NAVBLUE	NCIM	Charts content verified and approved	The Charts Content Administrator review the new charts content
3	Create Revision package	NAVBLUE	NCIM	Revision package created for submission	NAVBLUE will create the revision package using NCIM. They will include all the Company documentation added and the charts package
4	Review revision package	NAVBLUE	NCIM	Verify Revision package is correct	NAVBLUE will review the content of the revision package.
5	Approve Revision package	NAVBLUE	NCIM	Revision package approved	NAVBLUE will approve the revision package after reviewing
6	Publish Revision package	NAVBLUE	NCIM	Revision package approved	NAVBLUE will publish the revision package so that it is sent to the End user devices
7	Install new update package	End users/ Chart Content Administrator / EFB Administrator	Charts+ iOS Application	Revision package is sent to the End users for install	The End User will be prompted that there is a new revision package to download when they first open the Charts+ iOS application. They will then download this revision package on the device through the application



#	Activity	Actors	Tool	Main output	Description
8	Follow Up fleet configuration	EFB Administrator	NCIM	Traceability of the EFB data	The EFB Administrator will verify in NCIM that all users have installed the latest package

6.5 RECOMMENDATIONS FOR HMI CUSTOMIZATION

Charts+ iOS provides several different options for individual user configurations within the application interface. These device settings are available within the settings menu within the Charts+ iOS application.

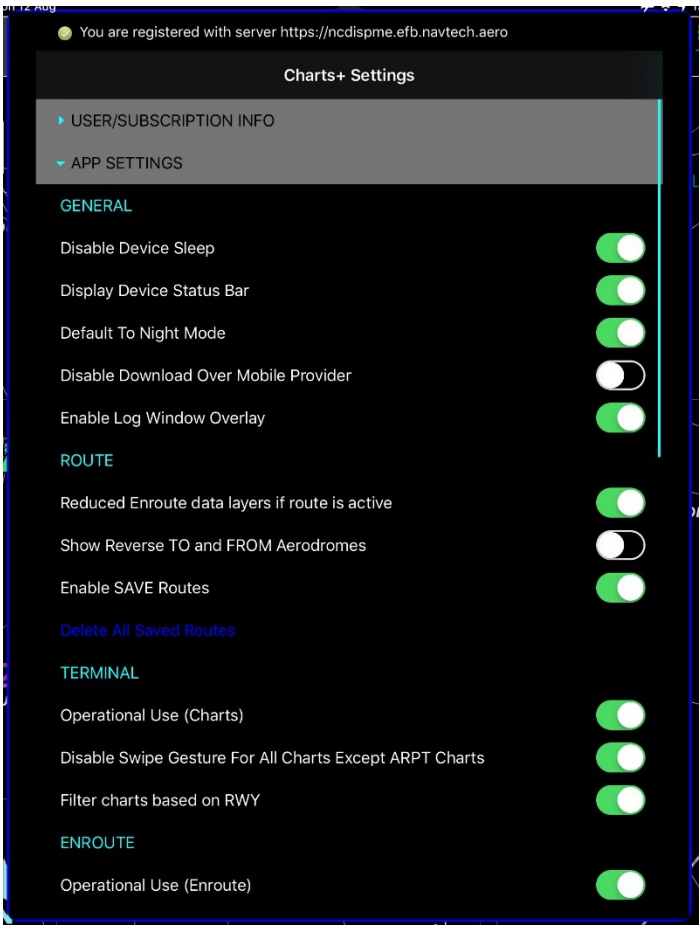


Figure 18: Charts+ iOS User settings

The following user settings are recommended:

GENERAL

- **Disable Device Sleep: Toggle on/off** (Prevents the iPad from entering sleep mode when Charts+ iOS is running).
Recommended: ON
- **Display Device Status Bar: Toggle on/off** (Displays iPad device status at the top of the application displaying connectivity and battery life)
Recommended: ON
- **Default to Night Mode: Toggle on/off** (When resuming use off the application the device will default to night colours)
Recommended: ON
- **Disable Download over Mobile Provider: Toggle on/off** (prevents package downloads over a mobile network. If this setting is turned off, you can download packages over a mobile network if Wi-Fi connections are unavailable. If you enable this setting you can download packages from Wi-Fi connections only. You will still see notifications if a new package is available regardless of the type of connection)
Recommended: user cost management decision
- **Enable Log Window Overlay: Toggle on/off** – this allows for a log window to be displayed for QA testing and support purposes only. The log window will only appear if this setting is toggled on and the user uses a three-finger gesture in the enroute map.
Recommended: OFF

Route

- **Reduced Enroute data layer if route is active: Toggle on/off** – once enabled this will reduce the number of layers present once a route has been activated. You will still be able to display your layers by selecting which layer you wish to see by using the layer toolbar.
Recommended: ON
- **Show Reverse ARR and DEP aerodromes: Toggle on/off** (Allows the use of a button that will reverse your ARR and DEP aerodromes within the application, meaning the user is not required to re-enter the ICAO codes if flying a reverse leg)
Recommended: N/A (Dictated by Company Policy/User discretion)
- **Enable SAVE Route: Toggle on/off** – this will enable the option to save and/or load a user defined route.
Recommended: N/A (Dictated by Company Policy/User discretion)

- **Delete All Saved Routes** – This “blue-text button” will only appear if “Enable SAVE Route = ON”. Tapping on the text will delete all saved routes.
Recommended: NA

TERMINAL

- **Operational use (Charts): Toggle on/off** (Removes watermark from terminal charts displaying “NOT FOR OPERATIONAL USE”
Recommended: ON
- **Disable Swipe gesture For All Charts Except ARPT Charts: Toggle on/off** (Allows the user to disable the “Swipe” gesture to swipe to the next terminal chart. The setting is applicable for all terminal chart categories except for the aerodrome (ARPT) category.
Recommended: N/A (Dictated by Company Policy/User discretion)
- **Filter Charts Based On RWY: Toggle on/off** (If a runway has been user-selected for the Departure (FROM) and/or Arrival (TO) aerodrome, the selectable terminal charts in the charts screen will only show those applicable for the selected runway).
Recommended: ON

ENROUTE

- **Operational use (Enroute): Toggle on/off** (Removes watermark from Enroute map displaying “NOT FOR OPERATIONAL USE”)
Recommended: ON
- **Show Aircraft Symbol: Toggle on/off** (Shows the aircraft symbol (own-ship depiction in Enroute moving map North-Up or Track-Up mode)
Recommended: N/A (Dictated by Regulatory or Company Policy)
- **Limited Map Refresh Rate** (Allows the user to reduce the enroute map rendering refresh rate to save battery in dependency from the aircraft speed)
Recommended: Disabled (Dictated by Regulatory or Company Policy)
- **Position Feed HIGH/LOW Accuracy Threshold: 50 meters (0.027NM), 100 meters (0.054NM), 500 meters (0.270 NM), 1000 meters (0.540 NM)** (Allows the user to define the accuracy threshold when the own-ship depiction shall be removed in the enroute moving map function)
Recommended: N/A (Dictated by Regulatory or Company Policy)

- **Disable Device Calibration: Toggle on/off** (Disables device calibration during use of the Enroute Map)
Recommended: ON
- **Show Mag. VAR. Isogones: Toggle on/off** (Displays the Magnetic Variation Isogons on the Enroute Map)
Recommended: ON
- **Show Lat/Long Grid: Toggle on/off** (Displays Latitude and Longitude Graticule on Enroute map)
Recommended: ON
- **Show Political Borders: Toggle on/off** (Displays Political borders on Enroute map)
Recommended: ON
- **Estimate Course When Unavailable: Toggle on/off** - this will estimate the course of the aircraft when the course value is unavailable from the location feed. Estimate course values may be inaccurate.
Recommended: OFF
- **Position feed loss timeout interval: 3, 5, 10, 30 seconds** – this will automatically disable the Enroute map centre mode when the position feed has been lost for either 3, 5, 10 or 30 seconds.
Recommended: 5 seconds
- **Enable NAV INFO pop-up: Toggle on/off** - enabling this function will pop up important navigation information based on a defined radius from your current position.
Recommended: N/A (Dictated by Company Policy/User discretion)
- **NAV INFO pop-up radius: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 nm** – This setting only visible if Enable NAV INFO pop-up is enabled. This setting allows you to define the radius from your current position when an important navigational information pop-up should be displayed. For instance, when you select 20NM, features on the enroute map within 20 nautical miles of your current position a pop-up will automatically be displayed showing you important navigational information.
Recommended: N/A (Dictated by Company Policy/User discretion)
- **Enable ERA Circle: Toggle on/off, Default ERA Circle (One Circle, Two Circles), Entry Method (Distance, Speed & Time)** – Toggling “Enable ERA Circle” to ON will allow the depiction of distance rings around enroute alternate (ERA) airports. If the setting has been switch to “ON”, the user can subsequently define how many distance rings should be depicted for every enroute alternate airport (“One Circle” or “Two Circles”) and the distance entry method for the distance circle’s radius (“Distance” or “Speed&Time”).
Recommended: N/A (Dictated by Company Policy/User discretion)

Documents

- **Highlights to Links within Documents: Toggle on/off** – this setting highlights embedded hyperlinks to other sections of the same document in customer documents which will allow the user to interact with.
Recommended: ON
- **Remove all Bookmarks** – Selecting this will remove all previously set bookmarks for documents from the document viewer.
Recommended: NA

VIRTUAL KEYBOARD

The Charts+ iOS application uses the iOS native virtual keyboard.

7. FLIGHT CREW PROCEDURES AND TRAINING RECOMMENDATIONS

This section provides recommended flight crew procedures and training for Charts + IOS.

7.1 PROCEDURES RECOMMENDATIONS

For Airbus aircraft, the EFB flight crew procedures are part of Airbus Standard Operating Procedures (SOP)

For other aircraft, the following generic actions (applicable to any type of EFB Type B application) should be added as a Standard Operating Procedure (SOP).

PRELIMINARY COCKPIT PREPARATION

All the following steps should be performed for all EFB devices hosting Charts+ iOS application:

- Switch on the EFB devices
- Start the Charts+ iOS application
- Check the Charts+ iOS package validity.
- Check the availability of new Charts+ iOS package
- Update the Charts+ iOS Package if required

SECURING THE AIRCRAFT

Both the following steps should be performed for all EFB devices hosting Charts+ iOS application:

- Stop the Charts+ iOS application
- Switch off the EFB devices.

7.2 TRAINING RECOMMENDATIONS

The following training recommendations should be included in the Operator's EFB training program in order to ensure safe and successful operations with the Charts+ iOS HMI and use.

7.2.1 FLIGHT CREW TRAINING

7.2.1.1 CHARTS+ IOS TRAINING

NAVBLUE provides a user's guide which is an appropriate abstract for pilot training on the application. In case of major functional changes for a new version of the application, NAVBLUE provides access to additional application-related training material (i.e. videos) through the NAVBLUE Academy workspace.

Before using the Charts+ iOS application in operations, an initial training by self-review of the Charts+ iOS user guide should be performed by the pilots [REF.1] or dedicated training material made available NAVBLUE Academy workspace.

This initial training should include the training items specified in section 7.2 and should be part of a larger training program covering the hardware aspects as well, like the use of the EFB hardware and the need for proper adjustment of lighting when the system is used inflight, hardware environmental limitations, etc.

7.2.1.2 CHARTS+ IOS CHECKING

There is no checking requirement.

7.2.1.3 CHARTS+ IOS CURRENCY

There is no currency requirement.

7.2.2 TRAINING ITEMS

7.2.2.1 INITIAL TRAINING ON CHARTS+ IOS

Areas of emphasis during initial EFB training concerning the Charts+ iOS application:

- The intended use of the software application together with limitations and prohibitions on its use;
- Proper verification of the applicability of the information (enroute map, terminal charts, route guide text information) being used and documents
- iPad device update process;
- If applicable, restriction to the use of the document browser;
- Proper use of the electronic charts versus paper charts, including:
 - Structure and hierarchy of the "Documents" menu,
 - HMI particularities, quick access menu, terminal chart menu functions, chartclip;
 - Enroute chart decluttering and use of layers toggle buttons (3-states color scheme);
 - Gestures in the Enroute chart screen (e.g. double tap);
- Use of the Enroute charts viewer in case of Flight Management System failure or in complex operational environments, as well as mitigations procedures in case of application failure;
- Activation and monitoring of the Enroute Moving Map auto-centering (MAP CTR Track Up or NORTH UP) function (with or without ownship symbol depiction) and conditions leading to automatic deactivation of the function;

- Ownship position accuracy indication
 - The Enroute moving map function should not be used to check, control, or deduce the aircraft position or trajectory;
- Failure of the applications;
- Restrictions on the use of the device (non-EFB applications and configuration management);
- Device battery management and autonomy.
 - Inform users about increased battery consumption when using on-device position sensor feeds.

These topics should be part of a larger training program covering the hardware aspects as well, like the use of the EFB hardware and the need for proper adjustment of lighting when the system is used inflight, hardware environmental limitations, etc.

7.2.2.2 RECURRENT TRAINING

No recurrent training items.

7.2.3 ADMINISTRATORS TRAINING

To get the knowledge about the Charts+ iOS administration tools (NCIM), the persons in operator's organization appointed as charts content manager and/or EFB Administrator(s) should acquire this knowledge through the reading of the NCIM documentation available from NAVBLUE (NAVBLUE Customer Information Manager (NCIM) administration manual).

8. SECURITY CONSIDERATIONS

There are no specific considerations for Charts+ iOS. The security considerations provided in the EFB regulatory guidance materials are applicable to Charts+ iOS.

9. RISK ASSESSMENT AND DISPATCH CONSIDERATIONS

9.1 RISK ASSESSMENT

9.1.1 INTRODUCTION

This section (§ 9) provides a detailed generic risk assessment for the use of the Charts+ iOS application.

This assessment considers both the following:

- Mitigation of the risks before the use of Charts+ iOS by the flight crew (Upstream processes)
- Mitigation of the risks during the use of the Charts+ iOS by the flight crew (Downstream processes)

This generic risk assessment may be used as a basis by Charts+ iOS operators to develop their own risk assessment for the use of the Charts+ iOS application.

9.1.2 GENERAL

9.1.2.1 INTENDED USE OF THE CHARTS+ IOS APPLICATION

The intended use of the Charts+ iOS application is as the primary means of aeronautical charting information within the Enroute and terminal airport surface environment.

The operator remains responsible for the EFB hardware hosting Charts+ iOS software and, the availability of customer documents when applicable, of any associated installed resource (mounting device, screen, connectivity, GNSS receiver, etc).

9.1.2.2 APPLICABILITY OF THIS RISK ASSESSMENT

This risk assessment is applicable to any aircraft.

9.1.2.3 RESPONSIBILITIES OF OPERATORS

It is the responsibility of the Operator to use this generic risk assessment to develop its own risk assessment based on its operational specifics and mitigation means. This risk assessment should be performed before entry into operation of the Charts+ iOS application, as part of its hazard identification and risk management process required by EASA ORO.GEN.200 or any other equivalent requirement.

The Operator is responsible for the implementation and validation of the mitigation means under oversight of its National Aviation Authority.

9.1.2.4 SUMMARY OF FUNCTIONS

The following functions of Charts+ iOS are considered for the risk assessment:

Provide the flight crew with access to mapping information for all phases of aircraft navigation and Pre-Flight Briefing	
Function 1	Provide display of airport terminal charts
Function 2	Provide display of enroute map data
Function 3	Provide PDF viewer to allow viewing of Company Specific documents attached to each airport
Function 4	Provide PDF viewer for Route Guide information required for Navigation
Function 5	Search items within the Enroute map
Function 6	Provide user interface to allow entering route parameters
Function 7	Display route and related information

9.1.3 ASSUMPTIONS

All the following assumptions were considered for the risk assessment:

- The flight crew received adequate training on the use of the Charts+ iOS application,
- The flight crew performs the applicable Standard Operating Procedures (SOP) regarding EFB.

9.1.4 UPSTREAM PROCESS

The following risks are mitigated through measures upstream of the Charts+ iOS software use by the flight crew:

Risk #1

Corruption of the Charts+ iOS database supplied by Charts+ iOS (production and transmission)

Mitigation #1

The Charts+ iOS database is produced in accordance with DO-200 standard.

Risk #2

Corruption of Charts+ iOS database by the Charts+ iOS software

Mitigation #2

Each Charts+ iOS database update is checked by the administrator. Therefore, any systematic error is detected by the administrator who leads corrective actions.

9.1.5 DOWNSTREAM PROCESSES

This section identifies the risks that should be mitigated while the Charts+ iOS application is in use. The mitigation means listed in the following table rely on backup means to be used by the flight crew in the case of a failure of the application.

9.1.5.1 FAILURE CASES BEFORE DISPATCH

Function 1: Provide display of airport terminal charts		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Total or Partial loss of functionality	Airport terminal charts display is not available	Use company-specific Back up means prior to dispatch
Loss of Pinch to zoom or pan functionality	Intuitive interactivity not available	Use manual chart selection method or use back up means (alternative device or paper charts)
Loss of Sketch functionality in Charts workspace	None	NA
Incorrect behaviour of Terminal charts RWY filter	Terminal chart cannot be selected nor depicted via regular workflow	Use Terminal Charts RWY filter "ALL" to show all charts.
Function 2: Provide display of enroute map data		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Incomplete display Enroute map	Display of inaccurate or incomplete Enroute map data	Use company-specific back up means
Loss of Pinch to zoom or pan functionality	Intuitive interactivity not available	Use pre-selectable zoom levels or use back up means
Loss of Day mode functionality for night operations	Blinding effects on user	Dim display to acceptable level or use back up means
Function 4: PDF viewer for Supplement information required for Navigation		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to display supplement information required for navigation or briefing	Use company-specific back-up means
Incomplete display of documentation	Unable to display supplement information required for navigation or briefing	Use company-specific back-up means

Function 5: Search items within the Enroute map		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to search for features within the Enroute map	Use the pan functionality to move to required feature. Interrogate feature via double tap and selecting from drop down list

Function 6: Provide user interface to allow entering route parameters		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to show flight route plotted within the Enroute map. Unable to show filtered route specific information.	Use the enroute map without route overlay and route information filter. Access to all relevant information is still available using the enroute map functions.
Function 7: Display route related information		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to show filtered route specific information.	Use the enroute map without route information filter. Access to all relevant information is still available using the enroute map functions.

9.1.5.2 FAILURE CASES IN FLIGHT:

Function 1: Provide display of airport terminal charts		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Total or Partial loss of functionality	Airport terminal charts display is not available	Open terminal charts in document viewer. If error persists, revert to secondary device with Charts+ iOS installed.
Erroneous Pilot Entries	Display of incorrect Airport charts and terminal procedure charts	Check Pilot entries in route entry tiles and/or chart title bar (always visible) and correct.
Incomplete display of terminal charts or documents	Display of inaccurate Airport charts and terminal procedure charts	Use back up means
Loss of Pinch to zoom or pan functionality	Intuitive interactivity not available	Use manual chart selection method or use second device
Loss of Sketch functionality in Charts workspace	None	NA
Incorrect behaviour of Terminal charts RWY filter	Terminal chart cannot be selected nor depicted via regular workflow	Use Terminal Charts RWY filter "ALL" to show all charts.
Function 2: Provide display of enroute map data		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Incomplete display of Enroute map	Display of inaccurate or incomplete Enroute map data	Revert to secondary device with Charts+ iOS installed.
Loss of Pinch to zoom or pan functionality	Intuitive interactivity not available	Use pre-selectable zoom levels or use second device
Loss of Day mode functionality for night operations	Blinding effects on user	Dim display to acceptable level or use second device
Loss of GNSS track information to enable enroute moving map function in Track-Up mode	None – <i>The display of own-ship position in flight as an overlay to other EFB applications should not be used as a primary source of information to fly or navigate the aircraft.</i>	NA
Loss of GNSS position information to enable enroute moving map function in Track-Up and/or North-Up mode	None – <i>The display of own-ship position in flight as an overlay to other EFB applications should not be used as a primary source of information to fly or navigate the aircraft.</i>	NA
Degradation of GNSS position information to enable enroute moving map function in Track-Up and/or	None - <i>The display of own-ship position in flight as an overlay to other EFB applications should not be used</i>	<i>Use certified navigation display as primary means to navigate and fly the aircraft:</i>

North-Up mode resulting in a location inaccuracy of the own-ship symbol	<i>as a primary source of information to fly or navigate the aircraft.</i>	<i>Except on VFR flights over routes navigated by reference to a visual landmark, the display of own-ship symbol is allowed only in aircraft having a certified navigation display (moving map).</i>
Incorrect depiction of Enroute Alternate Distance Rings	Distance to enroute alternate airport misinterpreted	<i>Use plotting charts (for ETOPS operations). Use Nav-Display as reference source for distance information.</i>
Incorrect behaviour of Enroute data filter (i.e. RWY length filter, SUA, CTL Area filter)	Display of incomplete Enroute map data	<i>Disable Enroute data filter</i>
Function 3: Provide PDF viewer to allow viewing of Company Specific documents attached to each airport		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	None – Company documents are not designed for Navigation purposes	NA
Company document not available	None	Inform Company
Function 4: PDF viewer for Supplement information required for Navigation		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to display supplement information required for navigation or briefing	Use second device
Incomplete display of documentation	Unable to display supplement information required for navigation or briefing	Use second device
Function 5: Search items within the Enroute map		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to search for features within the Enroute map	Use the pan functionality to move to required feature. Interrogate feature via double tap and selecting from drop down list

Function 6: Provide user interface to allow entering route parameters		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to show flight route plotted within the Enroute map. Unable to show filtered route specific information.	Use the enroute map without route overlay and route information filter. Access to all relevant information is still available using the enroute map functions.
Function 7: Display route related information		
<i>Failure Case</i>	<i>Operational Consequences</i>	<i>Mitigation Means</i>
Loss of sub function	Unable to show filtered route specific information.	Use the enroute map without route information filter. Access to all relevant information is still available using the enroute map functions.

9.2 DISPATCH CONSIDERATIONS

The objective of the 'dispatch considerations' section is to help the operator to define its minimal configuration to dispatch the aircraft with inoperative EFB system items (hardware and/or software) while an acceptable level of safety is ensured.

The dispatch considerations can be implemented in the Operator's MEL or any operational document of the Operator that describes the dispatch considerations of the Charts+ iOS devices.

NAVBLUE recommends that the Operator defines its dispatch conditions and to implement the backup means accordingly.

It is recommended that the Operator defines its dispatch conditions and implement the backup means accordingly.

The minimum configuration at dispatch for Charts+ iOS should include the following:

- One primary device with Charts+ iOS
- One backup mean (Alternative device or Paper charts)

10. OPERATIONAL APPROVAL/AUTHORIZATION CONSIDERATIONS

10.1 CONTINUED VALIDITY OF THE OPERATIONAL SUITABILITY OF CHARTS+ IOS

EASA and FAA evaluation results on the Charts+ software application are provided in the operational suitability letter for the Charts+ iOS application published by EASA and FAA.

All subsequent changes to the Charts+ iOS software application and/or the process of the Charts+ iOS data production are assessed by NAVBLUE, so that NAVBLUE can provide a recommendation to Operators about if the change requires that the Operator notify the NAA; in accordance with the provisions of its applicable EFB regulatory guidance (e.g. AMC2 SPA.EFB.100(b) of Regulation (EU) 965/2012 on air operations). Refer to §10.2.

In addition, NAVBLUE will determine if the change will be evaluated by the EASA and FAA to maintain their statement of operational suitability on the Charts+ iOS application and the associated manuals. Changes that will be subject to a supplementary operational evaluation by EASA and FAA will result in an update of the operational suitability letters published by EASA and FAA for the Charts+ iOS application.

The release note for each new version of the Charts+ iOS software application will perform all the following:

- Describe the changes introduced in the new version
- Specify if the changes were evaluated by the EASA and FAA to maintain their statement of operational suitability on the Charts+ iOS application and the associated manual.
- Provide the reference to the applicable operational suitability letters for the Charts+ application published by EASA and FAA.
- Recommend if the Operator should notify the NAA of the changes in accordance with the provisions of its applicable EFB regulatory guidance.
- Provide the reference to the applicable version of the Charts+ iOS User and Compliance Manual.

10.2 MANAGEMENT OF CHANGES TO CHARTS+ IOS BY THE OPERATOR AND ITS NAA

The AMC2 SPA.EFB.100(b) of Regulation (EU) 965/2012 on air operations provide guidance for the determination of both the following:

- The changes to the EFB system should not be notified by the Operators to their NAAs. These changes should nevertheless be controlled and correctly tested prior to use in flight.
- The changes to the EFB system should be notified by the Operators to their NAAs in accordance with the applicable change management procedure (e.g. EASA ARO.GEN.301(c)).

Note: The EFB system includes hardware, software applications, data used by the software applications and the procedures to use and administrate hardware and software applications in addition to data.

The FAA AC 120-76D provides the following criterion for the categorization of the EFB modifications:

- Minor modifications to EFB program can be incorporated without FAA review or assessment
- Significant program modifications require formal FAA review and evaluation before they can be authorized for incorporation into an EFB program.

Based on the above guidance from EASA and FAA, Airbus provides a recommendation to categorize the change to Charts+ iOS as either MINOR or MAJOR.

The correspondence of this Airbus criterion MINOR/MAJOR with EASA and FAA criteria for EFB changes is shown below:

Navblue Charts+ change	Regulation (EU) 965/2012 on air operations	FAA AC120-76D
MAJOR	Operator needs to notify the competent authority	Operator's responsibility Minor or Significant (to be determined in accordance with AC 120-76D 13.1)
MINOR	Operator does not need to notify the competent authority	Minor , without FAA review or assessment

The following paragraphs provide the criteria used to classify the change to Charts+ iOS as either Minor or Major.

10.2.1 MINOR CHANGES TO THE CHARTS+ IOS

Any change, that:

- (a) do not result in a hardware change that would require a re-evaluation of the HMI and human factors aspects in accordance with AMC1 SPA.EFB.100(b)(2);
- (b) do not bring any change to the calculation algorithms of a type B EFB application;
- (c) do not bring any change to the HMI of a type B EFB application that requires a change to the flight crew training programme or operational procedures;
- (d) introduce a new type A EFB application or modify an existing one (provided its software classification remains type A);
- (e) do not introduce any additional functionality to an existing type B EFB application; or
- (f) update an existing database necessary to use an existing type B EFB application, may be introduced by the operator without the need to be approved by its competent authority.

is considered as Minor.

Example of Minor changes:

- Update of the Charts+ iOS software application to introduce software fixes.

10.2.2 MAJOR CHANGES TO THE CHARTS+ IOS

Any change that does not comply with the criteria of a Minor Change is considered as Major.

Examples of Major changes:

- Introduction of a change to the HMI for an existing functionality that requires additional training for the flight crew
- Introduction of a new functionality.

10.3 IN-SERVICE FEEDBACK PROCESS

In accordance with their applicable occurrence reporting obligations (e.g. EASA ORO.GEN.160 or any other equivalent requirement), Charts+ iOS Operators are encouraged to report to their NAA in addition to NAVBLUE, responsible for the design of the Charts+ iOS software application and data, any incident and occurrence related to the use of the Charts+ iOS.

Occurrence reporting should be sent to NAVBLUE support via an "Incident Report" on NAVBLUE website.

All occurrences related to the use of the Charts+ iOS application will be collected, investigated and analyzed by NAVBLUE, and then corrected as appropriate (refer to §10.2). Correction may be performed in a new version of the software application or via an update of the NAVBLUE User and Compliance manual.

10.4 COMPLIANCE MATRIX WITH REGULATION (EU) 965/2012 ON AIR OPERATIONS

Annex IV - Part-CAT: CAT.GEN.MPA	Proposed means of compliance
CAT.GEN.MPA.141 - Use of electronic flight bags (EFBs)	Compliance means provided in corresponding AMC.
GM1 CAT.GEN.MPA.141 - Use of electronic flight bags (EFBs) DEFINITIONS	Information only.
GM2 CAT.GEN.MPA.141 - Use of electronic flight bags (EFBs) BACKGROUND INFORMATION	Information only.
AMC1 CAT.GEN.MPA.141(a) - Use of electronic flight bags (EFBs) HARDWARE	Out of scope of this User and Compliance Manual.
GM1 CAT.GEN.MPA.141(a) - Use of electronic flight bags (EFBs) VIEWABLE STOWAGE	Out of scope of this User and Compliance Manual.
AMC1 CAT.GEN.MPA.141(b) - Use of electronic flight bags (EFBs) APPLICATION CLASSIFICATION	Charts+ application is classified as Type B applications as per AMC3 CAT.GEN.MPA.141(b).
AMC2 CAT.GEN.MPA.141(b) - Use of electronic flight bags (EFBs) TYPICAL TYPE A EFB APPLICATIONS	Not applicable to Charts+ application.

Annex IV - Part-CAT: CAT.GEN.MPA	Proposed means of compliance
AMC3 CAT.GEN.MPA.141(b) - Use of electronic flight bags (EFBs) TYPICAL TYPE B EFB APPLICATIONS	Charts+ application is electronic aeronautical chart application which is classified as Type B application.
GM1 CAT.GEN.MPA.141(b) - Use of electronic flight bags (EFBs) TACTICAL USE	Information only.
GM2 CAT.GEN.MPA.141(b) - Use of electronic flight bags (EFBs) HUMAN-MACHINE INTERFACE (HMI) FOR TYPE A EFB APPLICATIONS	Not applicable to Charts+ application.

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
SPA.EFB.100 (a) - Use of electronic flight bags (EFBs) – operational approval	Operator's responsibility.
SPA.EFB.100 (b) - Use of electronic flight bags (EFBs) – operational approval	Compliance means provided in corresponding AMCs.
AMC1 SPA.EFB.100(b) - Use of electronic flight bags (EFBs) – operational approval SUITABILITY OF THE HARDWARE	Out of scope of this User and Compliance Manual.

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
(a) Placement of the display (b) Display characteristics (c) Power source (d) Environmental testing	
AMC2 SPA.EFB.100(b) - Use of electronic flight bags (EFBs) – operational approval CHANGES	At each delivery of a new software version, Navblue provides Operators with a Release Note that specifies the content of the changes in addition to the associated classification (minor, major) in accordance with the criteria defined in section 10 “OPERATIONAL APPROVAL/AUTHORIZATION CONSIDERATIONS” of the present document for requiring or not a notification to the competent authority and application of the approved change management procedure.
AMC3 SPA.EFB.100(b) - Use of electronic flight bags (EFBs) – operational approval OPERATIONAL EVALUATION TEST	Operator's responsibility. The operational evaluation test is the responsibility of the Operator with its NAA. The present compliance matrix, the sections referenced in this document can be used to prepare the operational evaluation test.
AMC4 SPA.EFB.100(b) - Use of electronic flight bags (EFBs) – operational approval EFB APPLICATIONS WITH ETSO AUTHORISATIONS	At the current time, no intention to apply for ETSO for Charts+ application.
GM1 SPA.EFB.100(b) - Use of electronic flight bags (EFBs) – operational approval FINAL OPERATIONAL REPORT	Information only.
GM2 SPA.EFB.100(b) - Use of electronic flight bags (EFBs) – operational approval EVALUATION BY EASA	Operator's responsibility. The Operator may use the evaluation results and recommendations provided in the EASA operational suitability letter to support its application to its competent authority for an operational approval.

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
AMC1 SPA.EFB.100(b)(1) - Use of electronic flight bags (EFBs) – operational approval RISK ASSESSMENT (a) General (b) Assessing and mitigating the risks	A Risk Assessment was developed by Navblue for the Charts+ application. Refer to section '9.1 RISK ASSESSMENT' of the present manual. Operator's responsibility: This risk assessment needs to be adapted by Operators to produce their Risk Assessment tailored to their operations.
AMC1 SPA.EFB.100(b)(2) - Use of electronic flight bags (EFBs) – operational approval HUMAN-MACHINE INTERFACE ASSESSMENT AND HUMAN FACTORS CONSIDERATIONS	Navblue has successfully assessed the Charts+ iOS application during Human Factor and Human Machine Interface evaluations. Refer to section 3 for more details.
AMC1 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval EFB ADMINISTRATOR	Navblue provides generic definitions of Administrators' roles and administration workflows. Refer to section 6 'ADMINISTRATION CONSIDERATIONS'. Regarding training recommendations for Administrators, refer to section 7.2.3 'ADMINISTRATORS TRAINING'. Operator's responsibility: It is the responsibility of the Operator to adapt this generic description to its organization and operations.
AMC2 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval EFB POLICY AND PROCEDURES MANUAL	Navblue provides a generic description of Administrator's roles and workflows for Charts+ iOS administration process in section § 6 - Administration Considerations of the present document. Operator's responsibility: The operator is responsible to adapt this generic description to its organization and operations. The operator is also responsible to describe it in this quality assurance documents.
AMC3 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval	Compliance means provided in sub items.

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
PROCEDURES	
(a) General	<p>Operator's responsibility:</p> <p>It is the responsibility of the Operator to build its flight crew procedures associated to the use of the EFB applications.</p> <p>Guidance are provided in section '7.1 PROCEDURE RECOMMENDATIONS'.</p>
(b) Flight crew awareness of EFB software/database revisions	<p>Operator's responsibility:</p> <p>It is the responsibility of the Operator to build its flight crew procedures associated to the use of the EFB applications.</p> <p>Guidance are provided in section '7.1 PROCEDURE RECOMMENDATIONS'.</p>
(c) Procedures to mitigate and/or control workload	<p>Operator's responsibility:</p> <p>It is the responsibility of the Operator to build its flight crew procedures associated to the use of the EFB applications.</p> <p>Guidance are provided in section '7.1 PROCEDURE RECOMMENDATIONS'.</p>
(d) Dispatch	<p>Recommendations for the dispatch considerations are presented in the present manual. Refer to section 9.2.</p> <p>Operator's responsibility:</p> <p>This dispatch considerations need to be adapted by the operator to its operations.</p>
(e) Maintenance	<p>Operator's responsibility:</p> <p>Based on Navblue document "Manual NAVBLUE CHARTS+ IOS" [ref 1] and "Charts+ information manager Help guide" [ref 2].</p>

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
(f) Security	Operator's responsibility: The EFB system security is the responsibility of the operator. Refer to section "8 SECURITY CONSIDERATIONS".
(g) Electronic signatures	Not applicable for Charts+ application.
AMC4 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval FLIGHT CREW TRAINING (a) Flight crew training (b) EFB training and checking (c) Differences or familiarisation training (d) Recurrent EFB training and checking (e) Suitability of training devices	Compliance means provided in sub items. Operator's responsibility: It is the responsibility of the Operator to build its flight crew training programs associated to the use of the EFB applications. Navblue provides its recommendations for the flight crew training in section '7.2.1 Flight Crew Training' of the present document. Operator's responsibility. Operator's responsibility. Operator's responsibility. Operator's responsibility.
AMC5 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval PERFORMANCE AND MASS AND BALANCE APPLICATIONS	Not applicable to Charts+ application.

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
AMC6 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval AIRPORT MOVING MAP DISPLAY (AMMD) APPLICATION WITH OWN-SHIP POSITION	Not applicable to Charts+ application.
AMC7 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval USE OF COMMERCIAL OFF-THE-SHELF (COTS) POSITION SOURCE <ul style="list-style-type: none"> (a) Characterisation of the receiver (b) Installation aspects (c) Practical evaluation <ul style="list-style-type: none"> (1) COTS used as a position source for AMMD (2) COTS position source used for applications displaying own-ship position in flight 	Use of Commercial-Off-the-shelf (COTS) position sources defined in release notes Operator's responsibility. Operator's responsibility. Not applicable for Charts+ application. Operator's responsibility.

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
<p>AMC8 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval</p> <p>CHART APPLICATIONS</p> <p>(a) Content (information necessary to perform operation safely)</p> <p>(b) Size, resolution and position of display</p> <p>(c) Own-ship position inflight on terminal charts</p>	<p>Navblue terminal charts are based on ICAO Annex 4 provisions. Navblue Enroute data content is based on Navblue paper enroute charts' content, but extended to allow additional functionality in an electronic, data-driven charting context. The electronic Navblue Guide document is based on the Navblue Supplement paper route guide series.</p> <p>The Navblue Charting product series (terminal charts, enroute charts/data and guide/supplement) have an operational track record of more than ten years with a large airline customer base.</p> <p>Operator's responsibility.</p> <p>Not applicable for Charts+ application.</p>
<p>AMC9 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval</p> <p>IN-FLIGHT WEATHER APPLICATIONS</p>	<p>Not applicable to Charts+ application.</p>

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
<p>AMC10 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval</p> <p>APPLICATIONS DISPLAYING OWN-SHIP POSITION IN FLIGHT</p> <p>(a) Limitations</p> <p>(b) Position source and accuracy: own-ship symbol removed if</p> <p>(1) estimated accuracy exceeds 50m</p> <p>(2) Position data is reported invalid by GNSS receiver</p> <p>(3) Position data is not received for 5 seconds</p> <p>(c) Charting data considerations</p> <p>(d) Human machine interface (HMI)</p> <p>(1) Interface</p> <p>(2) Display of own-ship symbol</p> <p>(3) Data displayed</p>	<p>Compliance means provided in sub items.</p> <p>Operator's responsibility.</p> <p>Refer to section 4.3 Display of own-ship position in flight</p> <p>Refer to section 4.3 Display of own-ship position in flight</p> <p>Refer to section 4.3 Display of own-ship position in flight.</p> <p>Operator's responsibility to select correct loss-of-position-feed monitoring settings.</p> <p>Not applicable for Charts+ application (no raster data used).</p> <p>The Charts+ enroute moving map display differs from any navigation display (refer to section 3 HMI CONSIDERATIONS).</p> <p>Charts+ application does not offer own-ship position depiction over terminal charts or over terminal procedures.</p> <p>Refer to section 4.3 Display of own-ship position in flight.</p> <p>Refer to section 4.3 Display of own-ship position in flight.</p>

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
(4) Controls (e) Training and procedures (1) Procedures (2) Training	Refer to section 4.3 Display of own-ship position in flight. Operator's responsibility.
GM1 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval EFB POLICY AND PROCEDURES MANUAL	Information only.
GM2 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval FLIGHT CREW TRAINING (a) Ground-based training (b) Flight training	Information only.
GM3 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval SECURITY	Information only.
GM4 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval IN-FLIGHT WEATHER (IFW) APPLICATIONS	Not applicable to Charts+ application.
GM5 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval USE OF COMMERCIAL OFF-THE-SHELF (COTS) POSITION SOURCE – PRACTICAL EVALUATION	Not applicable to Charts+ application as there is no AMMD function.

Annex V - Part-SPA: SPA.EFB	Proposed means of compliance
GM6 SPA.EFB.100(b)(3) - Use of electronic flight bags (EFBs) – operational approval APPLICATIONS DISPLAYING OWN-SHIP POSITION IN FLIGHT	Refer to section 4.3 Display of own-ship position in flight.

10.5 COMPLIANCE MATRIX WITH FAA AC120-76D

AC 120-76D	Proposed means of Compliance
EFB application types § 7	<u>§7.1 and 7.2. EFB application categorization</u> The Charts+ iOS application is considered as type B EFB applications in the AC120-76D Appendix B
Hardware supporting EFB applications § 9	Operator's responsibility This selection of the EFB systems hardware that hosts the Charts+ iOS application compliant with PED regulations is the responsibility of the Operator.
Evaluation of portable hardware components § 10	Operator's responsibility The Operator is in charge of demonstrating that its selected Portable Electronic Device (PED) satisfies the hardware operational considerations listed in these paragraphs of FAA AC120-76D.

EFB design considerations § 11.1 & §11.2	<p><u>§11.1 Integrity Considerations</u></p> <p>Navblue provides generic definitions of Administrators' roles and administration workflows. Refer to section 0. Regarding training recommendations for Administrators, refer to section 7.2.3.</p> <p>Operator's responsibility:</p> <p>These definitions and recommendations need to be adapted by the operator to its organization.</p> <p><u>Data file integrity:</u></p> <p>Charts+ iOS database production is applying a certified Quality management system for the "compilation, amendment production and supply of aeronautical documents, together with their distribution (see section 5.2.1). The distribution of data files from the NCIM ground segment to the Charts+ iOS applications is protected applying error-detection codes to detect integrity breaches.</p> <p><u>Software revision procedures:</u></p> <p>Navblue will provide new versions of the Charts+ iOS application and related information as defined in steps 6-13 of the Charts+ iOS update workflow (see section 6.4.1).</p> <p>Operator's responsibility</p> <p>Each time the Charts+ application is updated, the operator must perform steps 6-13 of the Charts+ iOS update workflow (see section 6.4.1).</p> <p><u>Flight crew member feedback:</u></p> <p>Operator's responsibility</p> <p>It is the operator's responsibility to provide adequate processes for flight crew member feedback. NAVBLUE provides a dedicated level 24/7 level 1, 2, 3 support for the operator's dedicated point of contact to address operator's feedback based on the operator-defined operational criticality.</p> <p><u>§11.2 Usability</u></p>
---	---

AC 120-76D	Proposed means of Compliance
	<p>Navblue has successfully assessed the usability of the Charts+ iOS application during Human Factor and Human Machine Interface evaluations.</p> <p>Refer to section 3 for HMI considerations for more details.</p> <p>Operator's responsibility</p> <p>The operator should select an EFB hardware that is compatible with hardware pre-requisites listed in the Chats+ iOS installation guide.</p>
EFB design considerations § 11.3	<p><u>§11.3 Legibility</u></p> <p>Navblue has successfully assessed the usability of the Charts+ iOS application during Human Factor and Human Machine Interface evaluations.</p> <p>Refer to section 3 for HMI considerations for more details.</p>

AC 120-76D	Proposed means of Compliance
EFB design considerations § 11.4-6	<p data-bbox="510 391 992 422"><u>§11.4 Responsiveness of Application</u></p> <p data-bbox="510 446 2128 518">The application provides clear and unambiguous feedback to the user when user input is accepted and whenever immediate application response is not possible due to background processes.</p> <p data-bbox="510 523 1839 555">The responsiveness for the display of data-driven enroute maps is dependent on device specifications.</p> <p data-bbox="510 579 826 611">Operator's responsibility</p> <p data-bbox="510 619 2128 691">The operator should select an EFB hardware that is compatible with hardware pre-requisites listed in the Chats+ iOS installation guide.</p> <p data-bbox="510 722 1319 754"><u>§11.5 Off-Screen Text and Content for Cursor Control Devices</u></p> <p data-bbox="510 762 2148 874">Off-screen content is indicated by consistently applying “scroll bar” indication of the visible content of information vs the overall content of information. For all document type of data (terminal charts, documents), the default position can be easily accessed. Refer to section 3.4 for more details.</p> <p data-bbox="510 914 788 946"><u>§11.6 Active Regions</u></p> <p data-bbox="510 954 1290 986">Active regions are clearly indicated by user interface design.</p>

AC 120-76D	Proposed means of Compliance
EFB design considerations § 11.7-8	<p><u>§11.7 Managing Multiple Open Applications and Documents.</u> Within the application, continuous indication of the currently active and depicted document is provided. When the user returns to an application running in the background, it appears in the same state as when the user left the application. See section 3.6 for more details.</p> <p>Operator's responsibility For the use of multiple EFB applications, it is the operator's responsibility to assure that the user is able to find which open flight deck applications are running and switch to any one of these open applications easily</p> <p><u>§11.8 Controls</u> Visual touch activation feedback is provided by the application.</p> <p>Operator's responsibility It is the operator's responsibility to assure all EFB controls are within reach of the flight crew, doesn't visually obstruct controls and instruments, and to choose appropriate input devices.</p>
EFB design considerations § 11.9-10	<p><u>§11.9 System Error Messages</u> Messages are operationally relevant and limited.</p> <p><u>§11.10 Data Entry Screening and Error Messages</u> User entered data is checked for correctness in the context of it's input. For incorrect input, visual feedback is provided. See section 3.2 for details.</p>

AC 120-76D	Proposed means of Compliance
EFB design considerations – Error and Failure Modes § 11.11	<p><u>§11.11.1 Flightcrew Member Error</u> Risk Assessment related to flight crew input errors has been developed for the Charts+ iOS functions. Refer to section 3.2 & 9 of the present manual.</p> <p>Operator's responsibility: This risk assessment needs to be adapted by the operator to its operations.</p> <p><u>§11.11.2 Identifying Failure Modes</u> The application has been designed to alert flight crew members of possible application failures and database integrity issues, such as loss of position feed, deteriorated application response time, corrupted databases, or inability to connect to the ground system to receive database updates. Refer to section 3 for HMI considerations.</p>
EFB design considerations – Flightcrew Member Workload § 11.12	<p><u>§11.12 Flightcrew member workload</u> The application HMI has been designed to minimize flightcrew workload. Refer to section 3 for HMI considerations.</p> <p>Operator's responsibility: Assessment of HMI, installation and aspects governing CRM when using the EFB system is the operator's responsibility.</p>

AC 120-76D	Proposed means of Compliance
EFB design considerations – Electronic Display of Aeronautical Charts § 11.13	<p><u>§11.13.1 Similarity to paper</u> Charts+ iOS provide a comparable level of information to paper charts: refer to section 2 and to [REF.1] for more details.</p> <p><u>§11.13.1 Legibility and 11.13.3 Screen size considerations</u> Charts+ iOS is designed for use on iPad with 9.7 inch displays or larger. Refer to section 3 for details.</p> <p><u>Operator's responsibility:</u> Assessment of hardware and screen resolution is the operator's responsibility.</p> <p><u>§11.13.4 Aeronautical charts</u> Aeronautical charts contain the same information as the respective Navblue paper chart product. Charts can be zooming, panning, or and easily returned to the default position. The enroute map can be panned, zoomed, decluttered and supports moving-map centering feature.</p>
EFB design considerations – Database Accuracy and Quality	<p><u>§11.16</u> A certified Quality management system is applied for all aeronautical databases used by the application. See chapter 5.2.1 for details.</p>

AC 120-76D	Proposed means of Compliance
EFB design considerations – Display of Ownship position	<p><u>11.17.1 Proper Use of EFB Own-Ship</u> <u>Operator's responsibility</u></p> <p><u>11.17.2.1 Position Source Selection</u> <u>Operator's responsibility</u></p> <p><u>11.17.2.2 EFB Own-Ship Directionality.</u> When track or heading is not available, the user is alerted, and own ship depiction is changed to a non-directional (circular) depiction.</p> <p><u>11.17.2.3 EFB Own-Ship GNSS Data Stream</u> Application own-ship is removed if the position becomes unavailable or is insufficient for the application. See section 4.2 for details.</p> <p><u>11.17.2.5 Map Zoom.</u> The application indicates the current level of zoom scale of the enroute map. The zoom level limitations consider the position accuracy of the own-ship symbol.</p>
EFB program components § 12	<p><u>Operator's responsibility</u></p> <p>NAVBLUE supports specific procedures by the design of the Charts+ iOS application, its NCIM ground segment, and the processes related to the dissemination of EFB application related information, such as Release Notes, this User and Compliance Manual, User Guides and training material. See sections 2.2 and 6 for details.</p>

AC 120-76D	Proposed means of Compliance
Modifying an Authorized Program § 13	Operator's responsibility Navblue considerations for operational approval/authorization are detailed in section 10. These considerations need to be adapted by the operator to its operations.