

Section 1

Introduction

Welcome

Congratulations on your acquisition of a Chelton Flight Systems FlightLogic EFIS (Electronic Flight Instrument System).

In the last two decades, aviation has become more and more complex; as a result, cockpit resources have followed the commercial carriers' trend toward **“automation-centered”** systems. These sophisticated systems minimize pilot involvement and automate control of the aircraft and its systems to the greatest extent possible, thereby relegating the pilot to the role of manager and emergency backup. Examples are flight directors and fly-by-wire systems where the pilot is removed from the information loop.

Your Chelton EFIS, on the other hand, was conceived and designed as a **“pilot-centered”** system. While still highly automated, this type of system, common in military tactical applications, presents the pilot with information necessary to make decisions about the flight and take the appropriate actions. A good example is the Highway-In-The-Sky (HITS). Hits allows for highly automated approaches, but its predictive nature gives the pilot unprecedented awareness of upcoming maneuvers. Contrary to the popular idea of overloading the pilot with information and options, Chelton Flight Systems EFIS products clearly and concisely present **ONLY** necessary information. This reduces pilot workload, decreases task complexity, and minimizes confusion. The result is safer flying.

Chelton Flight Systems' goal is **IFR-VFR equivalence** and the basic concept of the FlightLogic EFIS is proven HUD symbology overlaying a real-time 3-D virtual reality view of the outside world. The resulting “**synthetic vision**” provides the pilot in IMC with the same simple visual clues for navigation and aircraft control as those used in VFR conditions. This “**virtual VFR**” eliminates the need to scan multiple instruments for aircraft control or mentally interpret complicated enroute and approach procedures. As you gain experience with your Chelton EFIS, you will fly with more precision, awareness, and confidence than you ever thought possible.

Before You Fly

While the EFIS is extraordinarily easy to operate, it does rely heavily on advanced display concepts, so you will likely be exposed to some new terminology and ideas in the following pages.

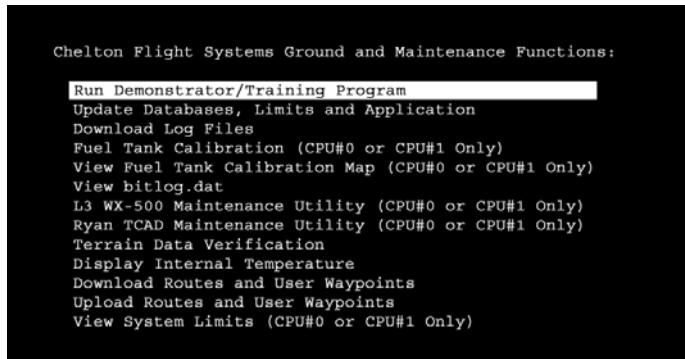
**FOR SAFETY OF FLIGHT, IT IS
ESSENTIAL THAT YOU STUDY THIS
ENTIRE MANUAL PRIOR TO FLYING
WITH THE EFIS.**

Using the Demonstration Application built into the EFIS, you can fly anywhere and perform any procedure (except takeoff and landing) that you can do in your aircraft. To use this feature:

1. With the power **OFF**, insert the data card a display (gold side up).



2. Power the system **ON** and select the **RUN DEMONSTRATON/TRAINING APPLICATION** option using the control knob (turn to scroll, push enter).



3. Practice procedures described in this guide.

When you are finished, power the system **OFF** and remove the data card.

Your Chelton dealer can supply you with a power adapter to allow running this application on a display screen at home while your system is being installed. Ask your dealer for details.

We recommend flying the system for 10 hours and completing at least 5 full instrument approach procedures (including the missed approach) in VFR conditions before use in actual instrument conditions. Professional instruction and recurrent training are highly recommended.

For a list of Chelton authorized flight instructors, please visit our website at www.cheltonflightsystems.com.

If you ever have any questions about the use of your FlightLogic EFIS, please do not hesitate to contact your Chelton dealer for assistance.

About this Guide

This document describes the operation of the Chelton Flight Systems EFIS with the software version specified in the footer at the bottom of the page and is divided into eight sections as follows: Introduction, System Overview, Display Symbology, Menu Functions, Step-by-Step Procedures, Quick Start Tutorial, IFR Operations, and Appendix.

System Overview

The **System Overview** provides a basic system description and block diagram, operational warnings, acronyms and abbreviations, coloring conventions, and a detailed description of the EFIS hardware.

Use this section . . .
to gain a basic understanding of the system.

Display Symbology

The **Display Symbology** section provides identification of each screen element of the flight display. For each software screen, every element of the symbology is identified on a sample screen. Immediately following the sample screens, all elements for that screen are listed in alphabetical order. This section also covers failure modes.

Use this section . . .

to identify and understand the elements you see on the screen.

Menu Functions

The **Menu Functions** section shows a flow diagram and selection options for each button and menu.

Use this section . . .

when you want to determine the function of a specific button or menu.

Step-by-Step Procedures

The **Step-by-Step Procedures** section will guide you through each system function.

Use this section . . .

when you want to perform a specific task like creating a flight plan or selecting an approach.

Quick Start Tutorial

The **Quick Start Tutorial** will give you the basics you need to go for a VFR familiarization flight with the system. In a few simple steps, you will learn to enter a waypoint and control the view on the display.

Use this section . . .

in conjunction with the Approved Flight Manual Supplement before you fly for the first time and for a quick refresher when needed.

IFR Operations

The **IFR Operations** section provides detailed information about selecting and flying instrument approaches, arrivals, and departures.

Use this section . . .

to familiarize yourself with instrument procedure conventions.

Appendix/Index

The **Appendix/Index** section contains support material and other useful information about system operation, including a complete Flight Manual Supplement and detailed discussions of TAWS functions. The Index provides an alphabetical listing of terms used in the guide with corresponding page numbers.

Use this section . . .

to review normal and emergency procedures, operational tips, specifications, or other reference material.

Substantive changes from the last version of this document are indicated with black bars in the margin.

Joe Pilot



“Hi, I’m Joe Pilot.

I have about a thousand hours flying this system and I’ll share some tips with you as you read through the manual. Due to the advanced nature of this thing, you may come across stuff you’ve never even thought about before. I’ll explain, in plain language, the important concepts that you need to know to use the system safely. Being a pilot, you probably hate to read instructions but, please, at least flip through the manual and listen to what I have to say.”

Revision History

Date	Document Version	Software Version	Changes
12/20/02	Rev. A	4.0C	Original
	Rev. B	4.0F	<ol style="list-style-type: none"> Added notice about lack of skyway terrain clearance Miscellaneous edits
8/1/03	Rev. C	4.0H	<ol style="list-style-type: none"> Replaced “warble tone” with “chime” Added hover vector symbology Added note regarding repeating alarms Added tadpole ILS symbology Added marker beacon symbology Added RMI/ADF symbology Added flight director symbology Updated menu structure diagrams Added detail regarding Zoom function Added detail regarding Lat/Lon function Deleted “pulled to ground” references in TAWS description Changed knob rotation direction for map scale Added note to altimeter setting instructions regarding flight path marker behavior above 50’ AGL while on ground Added note regarding paper charts vs. NavData Added reference to Terrain NOTAM on website Added details regarding GPS failure modes and dead-reckoning limitations Added Part 27/29 airspeed tape Updated component failure mode matrix Added discussion of wind calculation errors Added description of discontinuity Rewrote IFR Procedures section Added additional NOS charts to IFR Procedures section Updated TAWS system description in Appendix Updated menu diagrams and added descriptions Added holding pattern course reversals Created new cover artwork Added software version to revision history Added software version number to cover Miscellaneous edits
8/7/03	Rev. D.	4.0J	<ol style="list-style-type: none"> Updated software version to 4.0J

11/21/03	Rev. E.	4.1A	<ol style="list-style-type: none">1. Added description of AIU.2. Added step-by-step autopilot procedures.3. Added note regarding use of RMI on arcing approaches.4. Added MPH reference to indicated airspeed description.5. Added reference to third-party sensors.6. Revised waterline symbology throughout.7. Revised VSI and airspeed trend indicators throughout.8. Added note regarding fuel totalizer disabling on some installations.9. Added Gamma 1 reference to GPS WAAS description.10. Added full-time bank angle scale option.11. Updated unusual attitude display to include chevrons.12. Updated ILS and flight director symbology.13. Added aural annunciation of obstructions.14. Updated traffic and terrain pop-up behavior.15. Added OAT probe failure mode.16. Removed arc mode in traffic display.17. Updated behavior of flight timer.18. Removed flightplan requirement for DPs.19. Updated maximum number of flight plans.20. Updated fuel setting procedure with new graphic.21. Added default value for minimum altitude bug.22. Added increment reference to AGL indication, based on source.23. Added reference to Level-Off inhibit below 1,500 AGL.24. Updated software version to 4.1A.25. Miscellaneous edits.
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5/28/04	Rev F	5.0A	<ol style="list-style-type: none"> 1. Enabled DPs from enroute airports 2. F/S AOA indication 3. Added Ft./NM climb angle setting for DPs 4. Radio altitude display limited to +20 to +2,500 ft. 5. Expanded VSI range 6. Added RADAR INVALID caution 7. Added menu lockout 8. Added electronic slip indicator 9. Added remote nav and com tuning functions 10. Independent MFD settings between screens 11. Added Mach display to PFD 12. Added SEARCHING message to long search functions 13. Added DECEND NOW option for HITS 14. Enhanced display of obstructions on moving map 15. Expanded fuel flow display 16. Added ILS, ARTCC, and FSS to NEAREST function 17. Added Victor airways and Jet routes to flight planning and ACTIVE functions 18. Added transparency to TAWS caution and warning colors on moving map to make terrain contours visible 19. Added TAWS mode graphics to MFD Terrain description 20. Renamed intersections (INT) to fixes (FIX) 21. Added terminal fixes to navigation database 22. Added V1, V2, Vr, and Vref settings 23. Increased moving map range to 400NM 24. Added color-coded airspace depiction 25. Added altitude capture predictor for climbs and descents 26. Added OBS SYNC function 27. Added quick increment function (+5/-5 minutes) to countdown timer 28. Enabled DIRECT-TO waypoints in procedures 29. Changed TABS nomenclature to MAINS in fuel setting function 30. Eliminated heading deviation alert 31. Enabled multiple flight plans between same airport pairs 32. Raised EFIS cooling caution limit to 95°C 33. Changed “Level Off” annunciation to 30% of VSI threshold. Inhibited within approach procedures 34. Removed countdown chime from alert prioritization scheme 35. Increased maximum number of user waypoints to 500 36. Eliminate need for keyboard to perform database updates 37. Added Class A and Helicopter TAWS 38. Added transferring of routes and user waypoints. 39. Enlarged waterline symbol 40. Updated warranty 41. Added detailed ILS procedure 42. Updated GPS failure mode 43. Added instructions for ground training mode 44. Added Airplane Flight Manual Supplement to Appendix 45. Updated software version to 5.0A 46. Added unique flight plan names to Tips section in Appendix 47. Added warning regarding VFR approaches 48. Added date to revision history 49. Revised CWA alerts section 50. Added reference to CWA training aid on website 51. Enhanced graphics in Button/Menu Functions section 52. Revised system configuration drawing 53. Miscellaneous edits
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3/14/05	Rev G	5.0B	<ol style="list-style-type: none"> 1. Changed software to 5.0B 2. Actual horizon based on altitude instead of fixed 40 NM 3. Inhibited map traffic pop-ups when in approach mode 4. Eliminated auto declutter of VENR 5. Added Traffic thumbnail display to PFD screen 6. Added a proximity test based on 6NM for going into VFR APPROACH mode 7. Added ISA temperature to map 8. Enabled “all angle” intercept mode 9. Added option of ETA function 10. Made glide range declutterable 11. Added borders to map and to flight planner 12. All airways that share the route are now shown on airway label 13. Added one more declutter setting to improve AUTO declutter 14. Changed “DISPL” label to “FUNCTION” on map main menu 15. Eliminated need to press ACTV to continue adding airways to active flight plan 16. Added airspace and airway declutter to function declutter list 17. Map/PFD declutter settings no longer reset between power cycles 18. Created a target altitude that is distinct from VNAV altitudes 19. Target altitude now controls altitude pre-select function 20. VNAV altitudes for flight plan waypoints are individually settable 21. VNAV altitudes show in waypoint listing and PFD active waypoint box 22. Guidance and HITS track target altitude 23. Climb/Descent arc is dynamic 24. Eliminated “Descend Now” function 25. Added separate climb speed bug 26. VNAV bug is magenta. 27. Target altitude bug takes priority over VNAV 28. Changed PFD bug menu to use soft keys instead of scroll box 29. Changed minimum altitude bug to set in 10’ increments 30. Changed target altitude bug to set in 100’ increments 31. Changed INFO box to always show elevation 32. Added 50’ to VFR approach end point altitude 33. Added Helicopter TAWS to Symbology section 34. Added Field of View indicator to MFD symbology section 35. Added waypoint renaming details 36. Added pilot actions for CWA System 37. Added Terrain NOTAM to Terrain Database Updates section in System Overview 38. Added landing gear indication to PFD Symbology section 39. Updated terrain coverage map 40. Added Terrain NOTAM to TAWS section 41. Added no-bearing traffic and traffic obscuration due to terrain 42. Added moving map with hydrography sample 43. Added departure airport information 44. Added Index.
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11/11/05	Rev H	5.0B	<ol style="list-style-type: none">1. Added "NO GPS" flag to the Pilots Guide.2. Updated Index.
09/15/06	Rev J	5.0C	<ol style="list-style-type: none">1. AGL Increments Above 100 ft. Changed to 10 Feet.2. Rotorcraft Indicated Airspeed begins at 20 knots.3. FLTA Function Automatically Inhibited in HTAWS applications when the airspeed is below 50 knots.

Chelton Flight Systems is committed to producing the highest quality product possible; we welcome comments and suggestions concerning this manual. Please e-mail them to support@cheltonflightsystems.com.

Should you encounter problems with the operation of your Chelton EFIS, please complete and return the Service Difficulty Report in the **Appendix** section directly to:

Chelton Flight Systems Inc.
1109 Main St., Suite 560
Boise, ID 83702
OR
Fax (208) 389-9961

OR

Fax (208) 389-9961

OR

Complete the form at:

www.cheltonflightsystems.com/pilot_report1.htm

