The Craggy Aero Ultimate Le™ Flight Computer

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Craggy Aero Ultimate Le™

SailPlane Cockpits are enhanced by Craggy Aero's Ultimate Le Flight Computer. The System is a modular design and can use the hardware and software familiar to soaring pilots. Designed specifically for sailplane panels, you can use current hardware or grow your system as your needs and budget dictate. Pilots can start with an Ultimate Le and a NMEA GPS source or build an integrated system with Variometers, IGC logger, and PowerFlarm.

Design Goals

Design goals for the Craggy Aero Ultimate Le solve the issues with the sailplane's cockpit moving map.

- Cant's see the screen, sun reflection, glare
- Screen too small
- iPaq went dead, lost all my stuff
- Two different focal lengths
- Touch screen hard to use in turbulence
- PDA/PNA lockups
- Program refresh is slow
- System buzzes my radio "RFI"

Design Considerations:

- Use hardened industrial and aviation grade components
- Operating system that is stable and customizable
- True sunlight readable display
- Low Power Usage
- Use existing soaring hardware to provide complete systems
    - Varios
    - IGC Loggers
    - Flarm
- Runs the best and most popular software
- Uncluttered installation and wiring
- Easy to update programs or to download IGC flight files
- Limit RFI (radio frequency interference)
- Input Device
    - Use an input system that is familiar and easy to use

The computer

The computer module is based on the Marvell Xscale processor with 128 MByte of DDR SDRAM and 1GIG of NAND FLASH. It runs at 806 MHz with very low power consumption. The module delivers state of the art technology and high CPU performance. It offers interfaces needed in a modern embedded device with internal Flash memory and CompactFlash. It provides connectivity to LCDs with resolutions of up to 1024x768. A 16 bit codec allows audio processing. The computer offers an audio port, a serial port as well as 2 USB ports. Testing is underway with a Dual Core Processor, 1 GHz, with 512 MByte of DDR SDRAM and 1GIG of NAND FLASH.

The display

The Craggy Aero Ultimate Le aviation quality display sets the standard in sunlight readability it delivers a radically high level of screen brightness that results in unparalleled picture sharpness and vividness.

The VHB LED backlight in the LCD module consumes only 4.5 Watts at full brightness. The LCD screen temperature is quite small and there are few thermal management issues. The LCD module displays a VGA (640 x 480) image.

Contrast ratio is important in high and full sunlight applications. Contrast ratio of a display is defined as the luminance (brightness) ratio between a brighter state and a darker state. The color LCDs "white" state and "black" state are used to calculate the contrast ratio.

Contrast ratio = CR = luminance of the "white" /luminance of the "black".

If white and black are equally bright, then CR = 1 and the display is not readable. Due to the coatings applied to the display the contrast ratio of the Ultimate Le is extremely high. The high contrast ratio makes the view in direct sunlight only slightly dependent on the backlight intensity. Even at the low backlight setting the display is totally readable in full sunlight. These characteristic contribute to the overall superior direct sunlight performance in the cockpit. No longer do you need to run software in the white or no terrain mode, the color and clarity are vibrant in full sun.

Operating System Window CE 5.0

Windows CE is a modular/componentized operating system that serves as the foundation of the Ultimate Le. The CE Platform was designed specifically for low power, high reliable hands-off field OEM applications. CE exhibits robustness in its ability to operate without corrupting the flash boot image.

Soaring Hardware & Power Draw

The Ultimate Le allows use of almost any hardware component or mix of components common to sailplanes. Components are connected and some maybe be powered thru ports on the Ultimate Le. System examples range from the very simple to ones more complex and feature filled:

System examples include the Ultimate Le with:

1. Gramin GPS 18 or any NMEA GPS
2. CAI 302
3. Borgelt B800
4. LXNAV V7 – NANO
5. LX Navigation LX1606 - Colibri II
6. LXNAV V7 – PowerFlarm
7. LX Navigation LX1606 PowerFlarm
8. LXNAV V7 – PowerFlarm – CAI 302/303
9. Any Flight computer system that outputs NMEA

Table 1 Measured system power requirements at extreme backlight settings:

Table 1 Low/High Backlight		
System	Low	High

1	2W-200mA	7W-601mA
2	3W-300mA	8W-710 mA
3	3W-350mA	8W-760mA
4	6W-500mA	10W-890mA
5	6W-500mA	10W-890mA
6	7W-630mA	12W-1060mA
7	7W-630mA	12W-1060mA
8	9W-770mA	14W-1118mA

Software

The Ultimate Le is in use with popular software.

- SeeYou Mobile PNA
- ConnectMe
- Ultimate StrePla
- LK8000
- PocketFMS
- WinPilot ADV/PRO
- CAI Utility

The fast processor and 1 Gig FlashDisk memory allow a stable program platform. Options are available for addition CF memory. Programs are updated via the USB Stick using the Autorun feature. Maps, airspace and turnpoint data can be easily copied from a USB stick to the FlashDisk with the resident file explorer.

RFI (Radio Frequency Interference)

The Ultimate Le is designed and tested to provide uncluttered wiring installations and limit RFI to levels below DO-160 testing standards.

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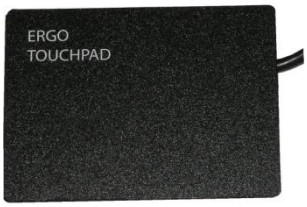
Input Device

The handheld USB trackball is intuitive and works like the mouse on your computer. It allows use with either hand. A USB touchpad can also be used strapped to your leg. We have an optional stick trackball controller in development. A variety of other USB mouse devices can control the Ultimate Le.



Installations Ultmate installations include: Ventus 2bx, Ventus 2cx, Arcus, Duo Discus, Ventus b, LS8, ASW 20, ASG 29, ASH 26E, ASW 29, ASW 28, ASW 27, ASW 17.

The Ultimate Le provides the pilot with a customizable affordable system to reduce cockpit workload. It provides the opportunity for improved performance and enhances your soaring experience.

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