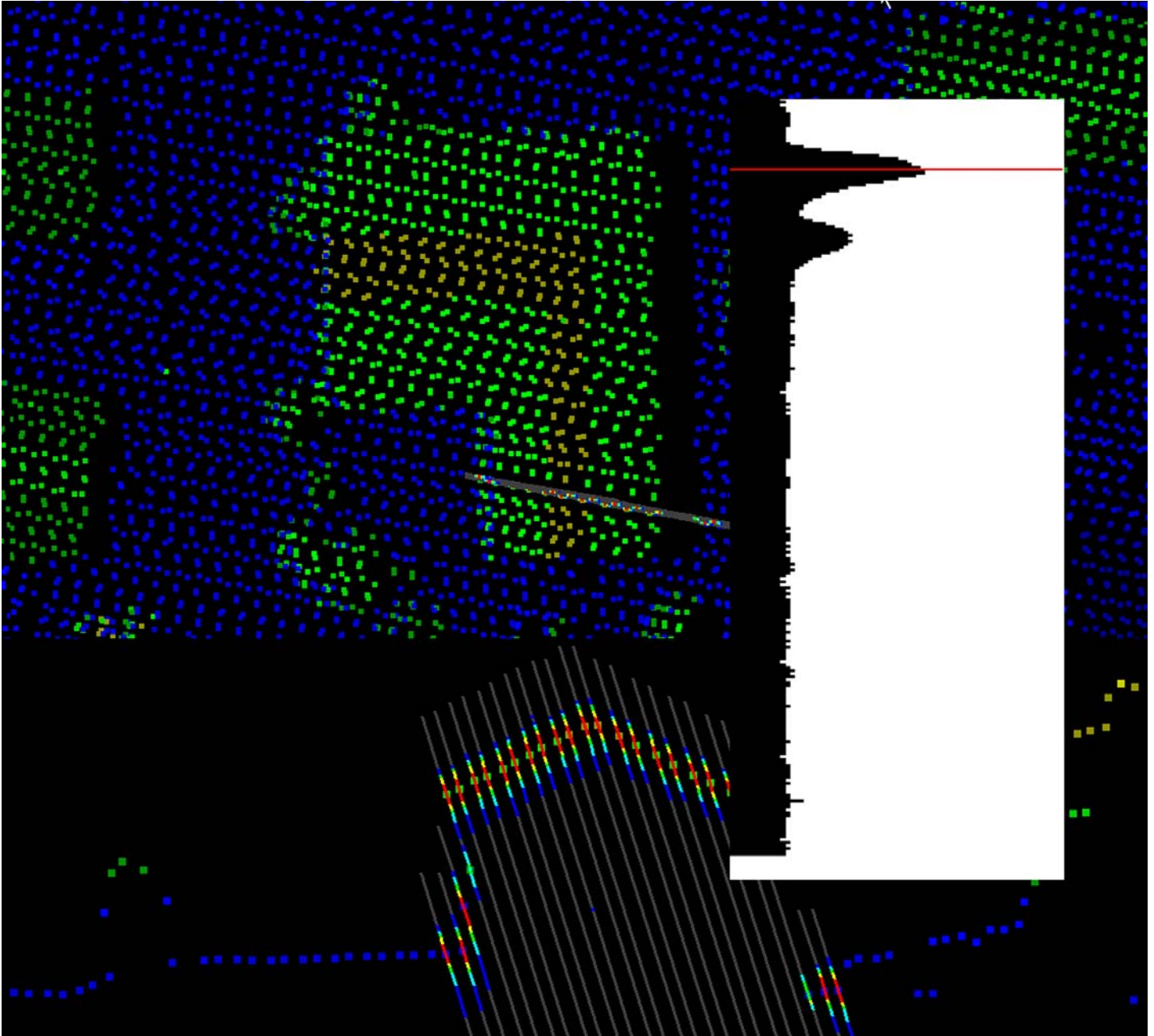


Leica WDM65

Waveform Digitizer Module Product Specifications



- when it has to be **right**

Leica
Geosystems

Leica WDM65

Product Specifications

OVERVIEW

The Leica WDM65 is a Full Waveform Digitizing (FWD) module designed specifically for use with ALS50-II and ALS60 Airborne Laser Scanners. It records the complete waveform of the reflection from surfaces intercepting the laser footprint. The recorded waveforms are georeferenced using GPS, inertial and scan angle information concurrently recorded as part ALS system operation. Systems employing the WDM65 retain all the functions of the ALS system, and discrete-return LIDAR operation continues in parallel with waveform recording. The user has the option of operation in discrete-return-only or discrete-plus-waveform modes. Data recorded during flight is processed using the additional ALS Post Processor module, which outputs the waveform data in the LAS 1.3 format, compatible with display on Terrasolid's TerraScan software as well as via Leica Wave Viewer software.

The WDM65 is internally mounted in the ALS system Controller; no additional hardware is required. It is available as an option on new ALS60 systems, and as an upgrade to existing ALS50-II and ALS60 systems. The WDM65 Option consists of additional new PCBs added to the ALS60 Data Logger Module (DLM). The WDM65 Upgrade also involves replacement of the existing DLM50 or DLM60 with a new DLM65 Data Logger Module compatible with the additional PCBs and wiring required for the FWD capability. The WDM65 Option can be installed at the customer site, while the WDM65 Upgrade is normally performed at the factory or Service Center.

In addition to providing the full waveform digitizing function, the WDM65 replaces the ALS50-II or ALS60 removable data storage drive with a solid-state drive (SSD), enabling higher-altitude operation up to the ICAO 25,000-foot level.

PACKAGING

Configuration	Internal in SC50 or SC60 System Controller (replaces existing DLM60; therefore no impact to ALS system size)
Weight	Increases weight of SC50 by 1.1 kg, SC60 by 0.9 kg
Power	Internal by SC50/60; waveform-specific modules increase power consumption by ~35 Watts

PROGRAM AND DATA STORAGE

OS installation	Non-mechanical drive
OS protection	Protected from improper shutdown via EWF on Win XPe
Data storage	Removable SATA SSD for data storage (uses existing ALS drive location)
Data recording capacity	Approximately 1.0 hour on MM60 160 GB SSD at max waveform rate and waveform size. Capacity proportionally longer at lower waveform rates and/or smaller waveform size. Data drives can be swapped in flight

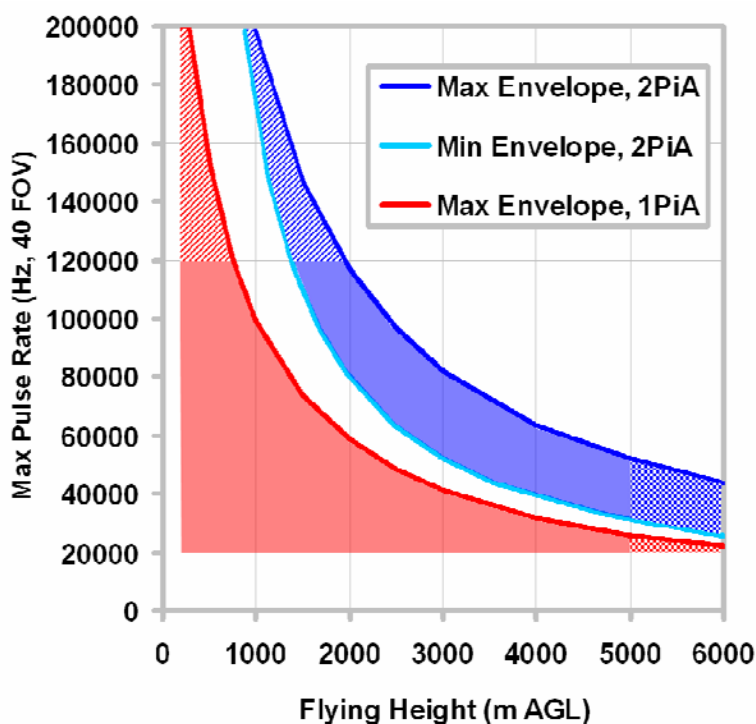
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PERFORMANCE

Operating modes	discrete return only or discrete return + digitized waveforms
Sampling routines (User controlled)	256 samples @ 1 nsec sample interval (default) 128 samples @ 1 nsec sample interval 256 samples @ 2 nsec sample interval 128 samples @ 2 nsec sample interval 64 samples @ 2 nsec sample interval
Sample resolution	8 bits
Max pulse rate for FWD	120 kHz, automatic 1:2 subsampling when laser pulse rate exceeds 120 kHz (see Figure 1 below)

Figure 1. FWD operation envelope.



Solid areas → Waveforms digitized for every laser pulse
 Hashed areas → Waveforms digitized for every other laser pulse (150 kHz max on ALS50-II)
 Checked areas → ALS50-II only (high altitude scan mirror required)

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SOFTWARE

Mission Planning	Leica AeroPlan (for ALS system setups), FPES (for flight line layout)
System Operation	FCMS <ul style="list-style-type: none">▪ GUI readily legible on a display of 1024 X 768 resolution (i.e., resolution of OC52 display)▪ GUI readily legible on an LCD display of 24.5 x 18.5 cm or larger (i.e., dimensions of OC52 display)▪ License-enabled feature (FWD feature license required)▪ FCMS accepts FWD flight plan from FPES; FWD-specific settings entered manually in FCMS▪ FCMS controls start / stop of FWD data recording▪ FCMS indicates FWD is connected▪ FCMS indicates FWD configuration▪ FCMS indicates FWD is recording▪ FCMS displays FWD error conditions▪ TracGUI used to view sample waveforms in flight<ul style="list-style-type: none">▪ Continuous update at 30 Hz rate▪ "Freeze" capability for extended view of single waveform
Logging Program	Incorporated into upgraded DLM firmware <ul style="list-style-type: none">▪ Outputs FWD configuration to flight plan file
Post-flight Processing	ALSPP – WFD Module <ul style="list-style-type: none">▪ Combines processed LAS point cloud with raw WFD data▪ Outputs in LAS 1.3 format (compatible with TerraSolid TerraScan)▪ Similar diagnostics / error handling as standard ALS data processing

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ENVIRONMENTAL

Environmental specifications are provided below for ALS60 installations. ALS50-II installations retain original ALS50-II environmental specifications.

Specification	Reference to Standard / Environmental Test Index
Operating Temperature and Altitude	RTCA DO-160F, Section 4, Cat B1, Max 40 C up to 2000 m AMSL or equivalent cabin pressure, then declining at 6.6 C per 1000 m to max 26.8 C at 4000 m AMSL or equivalent cabin pressure, then constant at max 26.8 C to 25000 feet (7620 m) AMSL or equivalent pressure, minimum 0 C at all altitudes.
Storage Temperature	RTCA DO-160F, Section 4, Cat B1, -55 to +85 C
Temperature Variation	RTCA DO-160F, Section 5, Cat B
Humidity	RTCA DO-160F, Section 6, Cat B, 0 - 85% RH
Operational Shocks and Crash Safety Level 2 for all Fixed-Wing Aircraft Types and Helicopter	RTCA DO-160F, Section 7, Cat E (FAR 27.561), 20g
Vibration	RTCA DO-160F, Section 8, Cat S
Magnetic Effect	RTCA DO-160F, Section 15, Cat B
Power Input	RTCA DO-160F, Section 16, Cat B
Voltage Spike	RTCA DO-160F, Section 17, Cat A
Audio Frequency Conductive Susceptibility – Power Inputs	RTCA DO-160F, Section 18, Cat B
Induced Signal Susceptibility	RTCA DO-160F, Section 19, Cat BC
Radio-Frequency Susceptibility (Radiated and Conducted)	RTCA DO-160F, Section 20, Cat RR
Emissions of Radio Frequency Energy	RTCA DO-160F, Section 21, Cat M
Lightning Induced Transient Susceptibility	RTCA DO-160F, Section 22, Cat A3E3X
Insulation Resistance and High Voltage	RTCA DO-160F, Section 25, Cat A

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Product Specifications

ACCESSORIES

763778 SATA Download Station Assembly, ALS (not required on ALS60 installations)

AVAILABILITY

New ALS60 systems available as option at time of manufacture (771706 FWD Option/Upgrade for FWD-ready SC60 + 771826 Feature License, Full Waveform Digitizer)

Existing ALS60 systems available as factory/Service Center upgrade (771708 FWD Upgrade for non-FWD-ready SC60 + 771826 Feature License, Full Waveform Digitizer)

Existing ALS50-II systems available as factory/Service Center upgrade (771707 FWD Upgrade for FWD-ready SC50 + 771826 Feature License, Full Waveform Digitizer + 773668 Upgrade, SC50 to FWD-ready / SATA SSD)

Note: All WDM65 installations require 773670 V7.x ALS System Firmware and 766470 FCMS Sensor Control, ALS. 771707 and 771708 also require flight test aircraft rental or customer-provided aircraft

DOCUMENTATION

Test Report Each system is supplied with an outgoing test report. Unless otherwise specified, all data are provided at maximum pulse rate.

User Manual A User Manual Supplement is provided with the delivered system

Proprietary information is supplied at the discretion of Leica Geosystems. All technical data shall remain proprietary to Leica Geosystems and is provided for the sole purpose of assisting in system usage and maintenance.

TRAINING, SUPPORT AND MAINTENANCE

Training Additional training is recommended with this option/upgrade. Additional training time will depend on user experience, but is nominally less than one week. Training sessions at the customer's site provide instruction for operators and processing technicians. Additional training support is available on a fee-for-service basis

Warranty One year on WDM65; other components subject to original warranty or ongoing Customer Care Package or extended warranties that may be in place

Customer Care Packages An extended support program including provisions for replacement parts and labor can also be purchased. Extended support programs do not cover limited life and/or damage sensitive items.

Whether you want to capture airborne data of an agricultural area or of a city, record the challenges in a disaster area or the expanse of a high tension line, you need reliable measurements and solutions for your entire workflow to build image-based maps. Leica Geosystems' broad array of airborne sensors and integrated software solutions capture data efficiently, reference imagery accurately, measure easily, analyze and present spatial information in 3D.

Those who use Leica Geosystems products every day trust them for their precision, their seamless integration and their superior customer support. When data really counts, Leica Geosystems delivers geospatial imaging solutions with precision, integration and service.

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