KESTREL TSCM
PROFESSIONAL SOFTWARE

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Key Features and Operational Advantages

Innovation is Simply the Beginning!

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Key Features and Operational Advantages of the Kestrel Software

- We are often asked of compare Kestrel ® to other products.
  - Such a comparative is generally not practical given the wide range of system design criteria, undeclared specifications, computing hardware, receiver and software capability of other products.
- Kestrel ® stands on its own merits; our goal and responsibility is to provide detailed information about Kestrel ® , so that the end-user can make an informed procurement decision.
- We are always here to assist with any questions or concerns about our software, just ask!
- PDTG Inc., is committed to the development of the most innovative, and highly-focused TSCM | SIGINT specific software available.

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Canadian Innovation!

Developed in Canada

Sold Worldwide

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- A strong commitment and exceptional track record with the first software release in early 2009.
- Our extensive experience is your power!
- Unprecedented innovation with significant new deployment tools and TSCM | SIGINT methodology.
- Innovation is our primary design methodology.
  - Industry leading, operator centric and TSCM | SIGINT specific Software Defined Radio (SDR).
- Strong Engineering Commitment by an Expert Software Development Group (SDG)™.
- Engineered by Extreme Experience!
- Global industry disruptive technology | Delivered!

Operator Centric

Engineered by Experience!

- Kestrel ® places the technical operator back in control of the mission and the analytical process.
- Full featured Technical Surveillance Countermeasures (TSCM) and Signals Intelligence (SIGINT) specific, standards-based SDR application.
  - Included features and advanced functionality extend well beyond the typical TSCM spectrum analyzer.
  - Each software feature is carefully developed, coded and evaluated to meet strict operator centric criteria.
- Software design is firmly engineered on a standards-based, real-world deployment methodology with a focus on a modern moving target threat model.
- Deployment Excellence in 52 Countries Worldwide at the National Security Level, public and private!

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Award Winning

"2013 Best New TSCM Product"

- **2018** | Canadian Technical Security Conference (CTSC)
  - Software Engineering and Development
- **2015** | Canadian Technical Security Conference (CTSC)
  - Software Defined Radio (SDR) Innovation
- **2014** | Canadian Technical Security Conference (CTSC)
  - Software Defined Radio (SDR) Innovation
- **2013** | Espionage Research Institute International (ERII).
  - Glen H. Whidden Award for Best New TSCM Product.
- **2013** | Canadian Technical Security Conference (CTSC)
  - Software Defined Radio (SDR) Innovation
- **2012** | Canadian Technical Security Conference (CTSC)
  - Industry Design and Innovation

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Worldwide Distribution Partners

Sales in 52 Countries

- Strategic non-exclusive authorized distribution partners located worldwide, to facilitate commercial and government procurement requirements.
- Centralized licensing and technical support delivery remains firmly in Canada under strict control.
  - Proprietary source code is tightly controlled in Canada, no foreign sub-contracting of the software, engineering or development process, is permitted.
- International distribution network is ideal for government national security apparatus who require in-country procurement.
- All technical support is provided by our Canadian based Technical Operators and can be elevated to our Software Development Group (SDG), if required.

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Canadian Based Technical (Engineering) Support Group (TSG)

- The most important aspect of software based resources, is the type and level of technical support.
  - Technical support is delivered by our Technical Support Group (TSG)™, consisting of Canadian based technical operators and software engineers.
- Technical support is delivered via email and remote desktop software, such as TeamViewer.
  - Level I support is provided by a qualified Technical Security Specialist (TSS) for most support issues and may be elevated to Level II support, if required.
  - Level II support involves our software engineering group lead developer, as required.
- There is no charge for our standard email or TeamViewer remote desktop based technical support delivery on an, as required basis.

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Simplified Software Licensing

No Annual License Maintenance Fees

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- A single software license is considered permanent across two (2) computers within a generational life cycle.
- Optional annual maintenance within the same software generation is available.
  - Software licensing supports, Dual Receiver Operation (DRO)™ at the time of purchase, or in the future, as deployment needs and requirements change.
  - This capability provides a scalable, budget friendly TSCM platform like no other.
- Updates, bug fixes, most new features and enhanced functionality are always provided free of charge.
- Optional generational software releases may require an upgrade fee.
  - Anticipated in 3 to 5 year generational intervals.

Custom Software Features

New Functionality Ready!

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- Our Software Development Group (SDG) can design, develop, and seamlessly implement custom end-user features and functionality.
  - Our quickest turn-around for a request for a new feature by a government entity, was just 12 hours allowing the feature to be field deployed the following day.
- Our experienced software design, engineering, and development group is totally operator focused.
- End-user input, new features ideas and improved functionality are strongly encouraged and welcomed.
  - Operators have been complaining for years about the lack of TSCM specific features across industry manufacturers, now you have a real voice!
  - Perhaps you will see your idea or a variation of the feature in the next major software release?

Lower Cost of Ownership

Ownership Cost Matters!

- Lower overall cost of system level ownership.
  - Flexibility, scalability, upgradability are all easily managed in a budget friendly procurement process.
- Future component upgrades can be better managed as deployment requirements and developing threat technology changes.
- Software and Firmware are easily updated to strengthen and extend the anticipated operational life cycle of the system.
- Now you can equip the entire team with individual Rapid Deployment Kit (RDK).
  - This is simply not practical or financially possible with expensive single box solutions.

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Budget Friendly Platform

Professional Features Matter!

- All field team members can be equipped with a dedicated, RF Rapid Development kit (RDK).
- Promotes greater efficiency and enhances operator situational awareness.
  - Significantly increases the Probability of Detection (POD) when on-demand field ready deployment is realized.
- Promotes stronger operator familiarization and field effectiveness in deploying and effectively detecting complex RF threats.
- Cost aside, it is the powerful and innovative features and functionality that brings real value to the ownership of the Kestrel TSCM ® Professional Software, Signals Intelligence Support System (SISS) ™.

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Typical Software Costing with (3) Select Options

$4,980.00 (CAD)

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- Kestrel TSCM ® Professional Software | Dual Receiver
  - $3,495.00 CAD
- Automatic Export Control (AEC) ™ | OPT AEC
  - Provides CSV export of RSSI, Spectra, and Trigger IQ.
  - $495.00 CAD
- Command Line Programming (CLP) ™ | OPT CLP
  - Provides audio alerts, email and SMS network alerting, control for system actions, and screen capture.
  - $495.00 CAD
- Tap Capture Plot (TCP) ™ | OPT TCP
  - Provides geo-location heat mapping for total energy of hostile emitters and unintentional TEMPEST radiators.
  - $495.00 CAD

Mission Agnostic by Design

Reduces the Requirement for additional TSCM Resources

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- Field deployment ready for virtually any RF based surveillance or monitoring requirement.
  - Support for a wide range of industry relevant SDR hardware options to meet the intended end-user mission specific deployment requirements.
- Convertible industry disruptive technology adapts instantly to changing mission parameters and requirements in the field.
- Technical, analytical and tactical requirements associated with TSCM, RSSM™, and SIGINT deployment, require flexibility, versatility, and scalability.
- Places the technical operator firmly back in command of the analytical process.

Low Profile

Travel Friendly

- Completely portable as a component based spectrum surveillance and monitoring system and advanced Signal Intelligence Support System (SISS).
  - Travels well in a standard laptop bag meeting low profile deployment requirements.
- Easily carry a laptop, dual USB powered search receivers, and antennas in a standard shoulder laptop bag.
- Provides the ability to instantly deploy a powerful electronic countermeasures resources when and where required.
- Powerful near-field portable antenna systems replace expensive and less efficient systems.

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Future Proof Architecture

Upgradable and Scalable

- SDR hardware, host computer platform and antenna technology are field upgradable as mission requirements change.
  - Kestrel can take on many different deployment roles on-the-fly maximizing deployment efficiency with less resources during travel.
- Cyclic upgrade budgeting is easy, as there is no requirement to replace the entire system as is the case with single box resources.
  - Software Defined Radio (SDR) is easily upgraded to include the latest application level tools and resources.
- SDR technology is obsolescence proof, extending the life cycle indefinitely, by replacement or upgrade of hardware components, as my be required.

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Field Serviceability

- Swapping out component level hardware is fully supported, and considered a major benefit.
- Often it will not be required to return what might be a single primary resource to the manufacturer for service.
  - Software Defined Radio (SDR) hardware is reliable and robust.
- Lower cost, promotes the ability to maintain multiple systems, including a secondary, or backup system component, if needed.

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Scalable Solution

Versatility by Design

- Start small or start big, based on budgetary and anticipated deployment requirements.
- Maintain building block components for maximum deployment versatility.
- Build redundancy and Fail-Safe operation at the system level.
  - Generate new sustainable revenue streams by adding additional professional services that are fully scalable, and cost effective for the end-user, such as Remote Spectrum Surveillance and Monitoring (RSSM) ™.
  - Deploy multiple revenue generating systems for less cost and a single, single box system.

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Host Computer Versatility

- Takes advantage of the latest and generally more powerful COTS computing hardware.
- Desktop, Laptop, Tablet, and Micro PC hardware is ready to meet specific deployment requirements.
  - Provides the ability to upgrade as new and more powerful computing technology becomes available.
- Can be installed on a backup computing platform for fail-safe redundancy and to facilitate the analysis cycle and for post collection report generation.
- Travel friendly laptop technology is less hassle at airport security and border security declarations.

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Computer Upgradable

Future Proof

- Upgrade, replace and customize the host computer hardware at any time.
  - The host computer doubles as an essential multi-mission and multi-tasking resource.
- One host computing platform supports a variety of mission requirements, which allows for greater efficiency during travel and deployment.
- Maximizes the operational life-cycle of the entire system.
- The host computer can easily be upgraded or updated as new technology is released.

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SDR Hardware Upgradable

Future Proof

- The receiver or analyzer is the heart of the systems capability, enhanced only by the capabilities of the software.
  - You are never stuck with obsolete hardware, simply upgrade or add the latest SDR hardware and utilize older receivers as backup resources or additional revenue generating deployment tools.
- Upgrade, replace, or change the receiver or spectrum analyzer as mission requirements change.
  - Older SDR hardware can be sold to finance the next generation of hardware.

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USB 2.0
USB 3.0
USB 3.1

Fiber-Optic Remote

LAN Remote

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- Direct host computer connectivity and wide range of optional hardware remote media conversion modules, allows for flexibility for unique deployment applications.
  - Support for USB 2.0 connectivity powered by the host computer.
  - Support for USB 3.0 / USB 3.1 connectivity powered by the host computer.
  - USB 3.0 to 200 Meters of 50 / 125 OM3 Multi-Mode Fiber-Optic Photonic Cable.
  - USB 2.0 to 100 Meters (or greater) of CAT 5e / Cat 6e LAN Cable.
  - USB 2.0 to 100 Meters (or greater) of 50 / 125 Multi-Mode Fiber-Optic Photonic Cable.

Powerful Operator Centric User Interface (UI)

- Our intuitive, user-friendly, work-flow based, operator centric UI places all essential and commonly accessed display and control groups up-front.
  - Dynamic control linking, the use of elementary Artificial Intelligence (AI) and predictive logic, intuitively optimize settings that remain under full operator control during runtime collection, analysis and review.
- The operator can setup, navigate, view and analyze, multiple instances of independent spectrum and waterfall data in familiar tabbed windows.
- The operator is able to configure all settings to optimize specific mission requirements.

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Global Positioning System (GPS)

Software and Hardware Support

- Support for multiple sources of generic USB GPS and hardware embedded GPS integration.
  - Automatically capture GPS coordinates to provide precise positional data utilized to resolve collection locations.
- Provides advanced RF capability for mobile Search and Rescue (SAR), Interference Analysis (IA), and Spectrum Regulatory assignments.
  - Provision for the manual entry of coordinates in the event a GPS signal is not available is supported.
- Support for hardware GPS connectivity for enhanced time stamping and positional integrity for geo-location algorithms.

Multi-Tasking Capability

Means Mission Flexibility!

- Designed to meet or exceed Commercial, Government, and Military, Technical Security (TSEC) requirements.
- Supports, mission-based Signals Intelligence (SIGINT), Technical Surveillance Countermeasures (TSCM), and Remote Spectrum Surveillance and Monitoring (RSSM) ™ assignments.
  - Kestrel ® is an ideal platform for mobile applications, such as our Mobile Monitoring and Analysis Platform (MMAP) ™ built around the Ford Explorer SUV.
  - Tactical RF surveillance and monitoring, and automatic geo-location heat mapping for wide area surveillance is fully supported.

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Virtual Reality Floor Plan and Mapping Import

Geo-Location Heat Mapping with TCP ™

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- Import architectural floor plates, 3D renderings, facility riser plots, facility site plans, air and marine navigation charts, geographical road maps, and virtual reality photographs.
  - Drag-and-Drop antenna locations and Rx positional ICONS onto any imported image.
- Default location block with advanced calibration grid, when no floor plan, map or image is available.
- Powerful Geo-Location Heat Mapping display supported by Single Receiver Operation (SRO)™, Dual Receiver Operation (DRO)™, and Multiple Receiver Operation (MRO)™.
  - Powerful geo-location algorithms, including Gaussian Weight, Inverse Square, Differential Free Space Power Loss (FSPL) and unique Power Line (PL) heat mapping.

Kestrel Project Templates (KPT)

Advanced File Management

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- Routine deployment is easy with our custom project template builder and editor.
- The operator can create, edit and store any number of project templates, and even save the current project as a template.
  - The ability to reuse complex templates significantly simplifies the initial setup process.
  - Our standards-based methodology allow a single Kestrel Project File (KPF)™ to be deployed on subsequent follow-up assignments.
  - This allows the technical operator to maintain a single project file containing all of the client data in a single location for post analysis and review.

IQ Record
IQ Playback
Loop IQ

IQ Conversion Utility

- IQ capability is the backbone of both analog and digital signal analysis capability.
  - IQ Record and Playback is supported as a proprietary KIQ file, or a standard CSV IQ file, or WAV format.
- Supports IQ Looping and Time Reference Sub-Sampling (TRSS) capability.
- IQ Conversion Utility easily converts standard CSV IQ files to Kestrel IQ (KIQ) file format.
  - Automatic Export Control (AEC)™ | OPT AEC supports the ability to Trigger and Record IQ samples.
- Support for Signal Hound Spike Software and Anritsu IQ playback.
- Transmitter Control for the Signal Hound VSG60A Vector Signal Generator (for all Kestrel ® supported playback formats).

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Advanced IQ Time Reference Sub-Sample (TRS)

Save IQ Clip

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- The ability to Time Reference Sub-Sample (TRS)™ historical Kestrel IQ (KIQ) files, permits highly-focused smaller IQ files to be rendered during playback.
  - KIQ Playback is supported as a proprietary KIQ file, or a standard CSV IQ format can be converted to KIQ to advantage this feature.
- IQ Loop capability allows the Time Reference Sub-Samples (TRS)™ clips to be loop (repeated) for extended signal analysis.
- IQ Conversion Utility easily converts standard CSV IQ files to Kestrel IQ (KIQ) file format.
- IQ is an essential requirement for TSCM and SIGINT applications.

IQ Import and IQ Export

- KIQ and CSV Export of IQ Data.
- KIQ and CSV Import of IQ Data.
- WAV Export of IQ Data
- Support for CSV IQ to KIQ file conversion.
- Supports Playback of DGZ, DGZM and XML IQ.
- Support for wideband capture and selective playback and analysis of IQ Data.
  - IQ data files may be rendered for playback analysis, without interrupting the runtime collection of spectra.
  - No receiver or analyzer required for playback of historical IQ files.
- Captured IQ data can be imported into an Arbitrary Vector Signal Generator (VSG), allowing real-time training potential in signal analysis.

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Colour Coded Automatic Threat Lists (ATL)

- Unique, colourful Automatic Threat Lists (ATL) bring clarity to complex data relationships.
- Support for manual entry of operator defined Signals of Interest (SOI).
  - Innovative Signal Combining Technology (SCT)™ simplifies the analytical process.
  - Manual signal level combining at the operator level for further refinements of the signal list content.
- Ability to customize ATL data table elements.
- Support for CSV export of all ATL table data including a combined export of all signal lists to a single CSV file.

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Integrated Signal Profile Database

- Integrated Signal Profile Database (SPD), enhances situational awareness.
  - Identifies and provides hierarchy of fundamental Vs Harmonic associations.
- The SPD feature aids in the review and analysis process.
- Individual signal profiles can be rendered to the Session Report Generator (SRG)™.
- Individual signal profiles can be rendered to the Advanced Report Generator (ARG)™.

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Dual Rx Ready

Multiple Rx Hand-Off Capability

- A standard software licence is Dual Receiver Operation (DRO) ready, connect any two (2) supported Rx on a signal software licence.
  - Hand-Off the Spectrum and Demodulation process across any supported receiver or analyzer instantly.
  - Seamless multiple receiver Hand-Off with real-time automatic Rx synchronization.
- Operator programmability permits each Rx to be assigned independent mission parameters, including sweep, demodulation and analysis.

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Multiple Band Capability

Tabbed Windows

- Innovative colour coded Spectra band tabs promote exceptional operator situational awareness.
  - Quickly, identify the status of each band and receiver.
- Support for any number of independently controlled tabbed Spectra windows.
- Support for any number of Spectra bands, across multiple receivers and analyzers.

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Support for Industry Significant Software Defined Radio (SDR) Manufacturers

- Kestrel Support Profiles (KSP)™ for Anritsu, CRFS, Rhode & Schwarz, Shearwater, Signal Hound, Tektronix, ThinkRF, Keysight, and SDRPlay.
- Future ready architecture support for the next generation of SDR receivers and spectrum analyzers.
  - End-user SDR receiver hardware support architecture to 325 GHz.

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Current Receiver Support

1 Hz to 50 GHz

- Support for 3.5 GHz, 4.4 GHz, 6 GHz, 6.2 GHz, 7.5 GHz, 8 GHz, 9 GHz, 12.4 , 14 GHz, GHz, 13 GHz, 18 GHz, 20 GHz, 27 GHz, 30 GHz, 32 GHz, and 43 GHz, and 50 GHz.
- Additional Kestrel Support Profiles (KSP)™ are currently under Development.
- Support for entry level, intermediate and advanced professional level hardware options.
  - Ability to support customer specified SDR hardware via a Kestrel Support Profile (KSP)™.

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Powerline Carrier (PLC)

Broadband Power Line (BPL)

3DEP-10

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- Software profile for PLC and BPL unintentional radiator verification.
- Power Line Carrier (PLC) and Broadband Power Line (BPL) analysis supported.
- Kestrel ® 3D Energy Probe (3DEP10) hardware support for PLC | BPL signal detection and characterization.
- Additional advanced hardware sensors and probes are currently under-development to accommodate additional testing protocols.
- Pending Release (Under Development);
  - Infrared (IR) Optical Modulation Detection
  - Visible Light (VL) Optical Modulation Detection.
  - Electro-Magnetic Field Density.

Analog Demodulation and FFT Visualizer

- Demodulated signal analytics ready, for AM, FM, SSB (USB) and (LSB) modes, and CW (Morse Decoding)
- Additional analog and digital demodulators are currently under development.
  - Sophisticated signal level FFT Visualization of the RF Spectrum, Audio Spectral Density (ASD), 3D Spectrum, IQ Diagram (with synchronization oscillator-offset), AIQ Diagram, IQ Vs Time, RSSI History, Analog RSSI (with trending), Audio Oscilloscope, and AF Spectrum.
- Multiple channel audio overlay with RSSI Tone Locator (RTL) feature for enhanced signal localization.
- AF Filters, IQ Recording and Playback, IQ Playback loop support.
- Audio sample capture and storage, utilizing the Kestrel Wave Recorder (KWR).

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Digital Demodulation and Protocol Analysis

- Pending official release.
  - Additional new demodulators, including both Analog and Digital formats.
  - Video demodulation and visualization rendering
- Demodulation and FFT visualization of key digital modulation modes.
- Common protocol analysis for key modulation types and formats.
  - Standard included COTS digital demodulation for commercial TSCM technical operators.
  - Advanced digital demodulation and protocol analysis for authorized end-users, including government, law-enforcement, military, and regulatory entities.

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Minimum Detection Amplitude (MDA)

- Establishes an operator defined threshold for threat detection.
  - Automatically captures continuous and periodic signal events that exceed operator threshold.
  - Absolute and Relative modes provide flexibility for narrow bandwidth and wide bandwidth Range of Interest (ROI) runtime collection.
- Generates an Automatic Threat List (ATL)™ of all signal events that exceed operator threshold.

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Chirp Threat Mode (CTM)

Threat Detection Algorithm (TDA)

- Positively detects, flags and characterizes analog audio transmitters within the defined target area.
  - Flags potentially hostile analog signal events containing room audio for further operator analysis.
- Colour coded CTM events flagged for exceptional clarity.
- Automatically resolves and hands-off identified harmonics to the Harmonic Signature Threshold (HST) list with a high degree of accuracy.

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Harmonic Signature Threshold (HST)

- Positively identifies and flags harmonic events against CTM confirmed hits.
  - Automatic Threat List (ATL) classification of harmonic events.
- Colour codes harmonic events flagged for exceptional clarity.

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Spectrum Baseline Logging (SBL)

- Establishes an operator defined threshold for detection and capture of the baseline ambient RF spectrum.
  - Automatically captures continuous and periodic signal events that exceed operator threshold.
- Generates an Automatic Threat List (ATL) of all signal events that exceed operator threshold.
- Colour codes SBL events flagged for exceptional clarity.

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Location Differential Signal Analysis (LDSA) ™

Import Comparative Bands

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- LDSA ™ is a powerful feature that allows real-time and post collection comparative analysis of location based spectra and waterfall trace data.
- The operator can import comparative spectrum trace data from any previously captured historical Kestrel Project File (KPF) ™.
  - Echo LDSA ™ is supported permitting real-time differential detection across the entire runtime Range of Interest (ROI) against any previously captured historical trace.
  - Live View Analysis (LVA) ™ and all navigation controls remain available.

Time Differential Signal Analysis (TDSA) ™

- TDSA ™ is a powerful new technology feature that allows real-time and post collection comparative filtering and analysis of operator defined time period analytics.
- The operator can define time block comparative of single and multiple locations, across multiple receivers.
  - TDSA ™ allows the technical operator to quickly isolate periodic burst signal events, that occur intermittently.
  - TDSA ™ is supported across all existing features and functionality.
  - TDSA ™ is supported across all display features, including our unique Signal of Interest (SOI) isolation display.

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Receiver Differential Signal Analysis (RDSA) ™

- RDSA ™ is a powerful feature that permits the independent operation of multiple radios for real-time multiple radio live spectrum overlay.
  - RDSA ™ allows geolocation across multiple radios.
  - Each radio is treated as an independent resource when RDSA ™ is invoked.
- The operator can validate RSSI levels across each radio and drop in live spectrum from any radio, band or sub-band on the fly as a PEAK, AVERAGE, or REAL-TIME display.

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Geo-Location Heat Mapping Display

RF Visualizer (RFV) ™

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- Our heat mapping display provides the ability to import and display any floor plan, geographical area map, 3D rendering, vertical riser, or virtual reality photograph.
  - The operator can drag and drop the radios as an overlay to invoke three (3) powerful algorithms to create a powerful geolocation resource with as few as two (2) radios.
  - The display can be scale calibrated directly from the HMD ™ window.
  - The ability to conduct "walk and tap" heat mapping is fully supported for wireless survey evaluations at the facility level or wide geographical areas.
- Algorithms include Gaussian Weight, Inverse Square, and Differential Free Space Power Loss (FSPL) modeling and "walk and tap" Analytics.

RF Visualizer (RFV) ™

Tap Capture Plot (TCP) ™

- The ability to visualize RF propagation is now a reality across the target area utilizing our geo-location heat mapping resource.
  - RF Visualization across and beyond the target area provides TSCM signal localization and walk-testing to determine propagation voids in signal coverage.
- Tap Capture Plot (TCP)™ provides the operator with band level, signal level, channel level, and custom Range of Interest (ROI) analytics.
- Automatic Real-Time Peak heat mapping display with advanced RF contouring across the defined search area.
- Location Differential Signal Analysis (LDSA)™ is following supported at the application level.

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Dynamic Trace Autonomous Platform (DTAP-GPS)

- The latest in disruptive TSCM specific functionality is not available within the software
- Option (DTAP-GPS) ™ provides an entirely new level of sophistication across TSCM and SIGINT applications.
  - Covert (backpack), vehicle (mobile), UAV, aircraft, and space applications benefit from advanced geo-location heat mapping
- DTAP-GPS ™ is restricted for TSB approved sales only and requires an end-user certificate.
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Live View Analysis (LVA)

- Support for real-time Signal of Interest (SOI) analysis, without interrupting the runtime collection process.
  - Open and navigate historical files for playback of Spectra and Waterfall data during post review and analysis.
- All Positional Zoom Control (PZC), Horizontal Range Control (HRC) and spectrum display features are available during runtime and post event analysis.

Live View DSA (LVD)

Real-Time (Echo) DSA

- Display the current live collection location against one or more historical location based traces without interruption of the runtime collection process.
- Unique echo mode permits Live View DSA (LVD) to display a real-time differential trace between the current location and any available historical trace data.
  - Permits any historical trace to be run as a direct comparative against the current runtime trace location.

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Automatic Export Control (AEC)

OPT AEC

- Support for periodic export of MDA, SBL, CTM, HST, and DAA threat and signal list data to CSV file format.
- Export all data on an operator defined activity schedule, or export only changes since the previous timed export event.
- Triggered export of CSV based RSSI, Spectra, and IQ, including event pre/post buffer DAA Exceedance, DAA Loss, New MDA, New SBL, New CTM, and New HST.
  - Operator defined CSV table level programming of any available data element.

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Command Line Programming (CLP) ™

OPT CLP

- There are three (3) powerful elements to the CLP ™ feature.
  - 1 | Operator defined, application wide audio alert programming.
  - 2 | Operator defined, system level triggering for hand-off to IQ analyzers, smart ECM interaction, third-party demodulation and analysis programs, and automatic screen capture, etc.
  - 3 | Network alerting package that permits operator defined EMAIL and SMS network notifications.
- The CLP ™ feature works standalone, or in concert with the Automatic Export Control (AEC) ™ and the Dynamic Alert Annunciator (DAA) ™ to provide a very powerful autonomous collection and reporting system.

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Remote Spectrum Surveillance and Monitoring (RSSM)

- Ready to deploy on-the-fly in a TSCM or RSSM role.
  - Remote Network access via LAN, DSL, and 3G / 4G / LTE Modem.
- Secure RSSM™ Command and Control Management via TeamViewer, or other suitable third-party Remote Desktop Software (RDS).
- Setup, Programming, Remote Reboot, Signal Level Review, Analysis, Characterization and Classification, all via a Network Connection.
- Unattended collection for days, weeks, or months, utilizing our unique write compression capability.
- Analysis is easily accomplished via a network connection and Remote Desktop Software (RDS).

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Advanced Signal Intelligence Database (ASID)

FCC and IC TAFL

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- FCC, TAFL, ACMA Frequency Licensing Databases included as a standard feature.
  - FDB overlay displays Free Space Power (FSP), as well as the Bearing To / From Station.
  - Search criteria filters for Free Space Power (FSP), and geographical area coordinates in Nautical miles, or both.
  - Supports triangulation based on RSSI Rx DSA locations, selectable at the signal level within the FDB window.
  - Mapping visualization support for Google Maps, Google Satellite and Street View.
  - Static image positional orientation overview reference map image generator.
  - FDB updates for FCC, TAFL and ACMA databases is available for operator download
- Selective FDB zoning across FCC, TAFL and ACMA data to facility regional geographic boundaries, and Canada, United States of America border regions.

Operator Signal List (OSL)

- Support for an unlimited number of operator defined and maintained, Operator Signal Lists (OSL) at the application level.
- Ability to maintain any number of OSL databases at the facility level, for known hostile signals, known friendly signals, manufacturer specific frequency data.
  - Display currently loaded OSL as a spectrum overlay to quickly identify matching signal events within the currently displayed spectra band.
- Individual OSL database files can be easily transported to another system, if required.
- The ability to hide of view the OSL graphical overlay is supported on the User-Interface (UI).

Channel Profile Masks (CPM) ™

- Allows official bands, sub-bands, Range of Interest (ROI) to display as a graphical overlay for easy identification.
- CPM ™ bands are fully operator programmable.
  - Band level and channel level programming is supported utilizing the CPM ™ Editor.

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DSA Trace Limit

Trace Count Limit

Activity Event Alarm

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- The DSA Trace Limit and Trace (Time) Count feature allows the technical operator to define the Trace Limit and Trace (Time) Count, for the current location.
  - A activity event alarm will sound at the completion of the capture process, prompting the operator to move to the next DSA collection location.
  - This allows the operator to tackle other tasks during the collection process.
  - At the end of the defined cycle, the software locks the current location and sounds the process event alarm.
  - The operator can override the alarm and restart collection at the same location or move to the next location.

Multiple Instances of the Kestrel Software

- The ability to open a second or even third instance of the software permits uninterrupted collection, and historical project analysis and review, all at the same time.
  - Establish a runtime collection and complete analysis and report generation within a second instance of software on the same host computer.
  - The first instance initializes all available radios and the second instance ignores the first instance.
- IQ demodulation resources remain fully functional during the second or third instance of the software allowing fully operator analytics of historical IQ files.

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RSSI Tone Locator (RTL)

- RSSI based direction-finding is simplified at the Signal of Interest (SOI) level.
- Activate the amplitude based RSSI Locator Tone (RTL) as a standalone walk-about direction-finder.
  - Support for multiple channel audio supports the ability to monitor the Signal of Interest (SOI) audio and the RTL tone independently or simultaneously.
- Utilize FFT Visualization to determine the RSSI levels of the signal source.
- The RSSI Tone Locator (RTL) works with the Analog RSSI FFT display to provide device audio, RTL audio and signal level trending.

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Kestrel Wave Recorder (KWR)

- Record audio samples of both analog and digital Signals of Interest (SOI) during the demodulation process.
  - Files are saved as a common WAV format for playback without the Kestrel ® software.
  - Externally imported WAV files can be played back within the software.

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Kestrel TSCM Professional Software

Setup Wizard

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- Establish a runtime environment with a highly structured format that is export ready for report generation.
- Establish virtually all necessary programming parameters within a single Setup Wizard.
  - Project Description
    - GPS Coordinates
  - Activity schedule
    - Time Zone
    - DSA Trace count limit
    - Event Alarm
    - Collection Duration
  - Antenna Locations
  - Spectrum Bands

Project Activity Scheduler

Activity Alarms

- The ability to precisely schedule multiple spectrum bands across multiple receivers is fully supported.
  - Create hardware independent start and stop cycles for individual bands across any receiver.
  - Programmable Project Activity Scheduler event alarm.
- The ability to produce activity scheduler alarms is supported.

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Sub-Harmonic and Harmonic Calculator

- Innovative Harmonic and Sub-Harmonic Calculator displays SOI harmonic relationships from 1 / H2 to 1 / H9.
- Provides unique threat detection opportunity below the fundamental frequency.
  - Harmonic Calculator displays SOI harmonic relationships from H2 to H9 based on an operator defined fundamental frequency value.
- Support for Drag-and-Drop of any displayed table value to the User-Interface (UI) and Demodulator.
- Fundamental and harmonic values can be displayed as a spectrum overlay.
  - Our Harmonic Tool supports our drag-and-drop technology.

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Write Compression

File Management

- Supports real-time write-to-storage capability for fail-safe reliability.
- Write to Internal or External HDD.
- Write to Internal or External SSD.
  - Powerful write compression algorithm for extended TSCM / RSSM deployment.
- Increases file management efficiency and results in a significantly smaller project file size footprint.
- Captures all spectra and waterfall peak data elements at the (1 / n=?) value and writes a single Kestrel Super Trace (KST).

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Kestrel Super Trace (KST)

Playback Spectra During Extended Deployment

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- The Kestrel Super Trace (KST) is a function of write compression.
  - If (1/n=100) is defined by the operator, all of the peak data captured from the first 99 standard traces will be written to a single trace (100), defined as a Kestrel Super Trace (KST).
- All discrete peak trace data is captured and displayed during analysis as a single KST.
- Successive time stamps reflect the KST and therefore a minor displacement in event time accuracy, which varies with the (1/n=?) value progression, will occur.
  - The result of (1/n=100) is a storage footprint 100 times smaller, bringing greater efficiency to the analytical process.

Triggered File Write Management

ARM and REC

- Support for triggered capture of Signal of Interest (SOI) events.
- Results in capturing only critical SOI events for analytical analysis.
  - Spectrum Analyzer (SA) only mode, when write to storage is not required.
- ARM is a triggered REC mode that records triggered DAA exceedance or loss during runtime for any number of active DAA alert zones.

Dynamic Alert Annunciator (DAA)

- Real-time interactive PASS / FAIL spectrum event status monitoring on a primary and secondary mini-display.
- Real-time unattended or operator assisted event status capture and alerting.
  - Unlimited number of operator defined Alert Zones.
  - Detect Loss and Exceedance events in real-time.
  - Advanced alert zone technology includes both Absolute (ABS) and Relative (REL) detection capability.
- Export DAA Threat / Signal List data to CSV file format.
- View event based statistical details at the signal level.
- DAA triggered IQ capture and recording.

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Software Programming and Operation Manual (SPOM)

- Our SPOM documentation is one of the most thorough software technical manuals in the industry.
- SPOM is authored and maintained by technical operators for technical operators.
- Serves as not only an operational document, but rather a self-guided operational training manual.
  - Quick deployment charts are available for essential field deployment tasks.
- Rapid deployment charts are available for a number of essential deployment tasks.

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Advanced Feature Operation

Supplemental Documentation

- Our supplemental documentation series supports advanced and optional feature sets as they are released.
  - Supplemental documentation provides feature specific operational details and examples.

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Session Report Generator (SRG)

Standard PDF Report Rendering

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- Innovative Session Report Generator, based on the TSB 2000 (Technical) Standard TM.
- Intuitive SRG interface, supports multiple reports, for reader specific parameters.
  - Support for On-the-Fly session report generation.
- Output saves directly too an easy to handle PDF format.
- Import feature for target area photographs.
  - Customizable report cover page logo.

Advanced Report Generator (ARG)

Next Generation Feature

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- Our ARG is the next generation in report rendering and provides a total solution for producing a report that spans not only the RF phase, but all other aspects of the inspection process.
  - Support for ad hoc Kestrel Field Reports (KFR) that enhance the on-site verbal report process.
- Advanced "drag and drop" technology support permits the operator quickly and easily build a full technical report on site or during post review.
- The ability to import all standard formatting in a single reference file provides the ability to customize and reuse the document structure.
  - The ability to customize the report for in-house, sub-contractor, and end-user applications is fully supported..

File Management

Fail-Safe Operation

- All captured spectra and waterfall trace data is written to the storage media in real-time, unless otherwise programmed by the operator.
  - All single session runtime files are appended to a single Kestrel Project File (KPF) directory.
- Fail-Safe project level AUTO-RESTART feature permits automatic recovery of the runtime environment in the event of a system crash or machine restart.

Powerful Positional Zoom Control (PZC)

- The most powerful spectrum navigation capability in the industry.
  - Navigation is intuitive and operator centric.

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Powerful Horizontal Range Control (HRC)

- Custom programmable HRC provides powerful display range control for precision analytical review.
  - Innovative HRC database derived from the operator defined Spectrum Profile File (SPF) database.
- Precise on-the-fly navigation and display of specific allocation bands or frequency ranges without the need to set the start and stop frequencies manually.

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Probability of Intercept (POI) Calculator Display

- A realistic real-time POI tool provides immediate runtime analysis and feedback to the operator as to the Probability of Intercept (POI) within the current runtime state.
  - This information is extremely important for the technical operator to assess the ability of the radio to capture extremely fast burst signal events.
  - For example, if the current sweep speed is 57 mSec and a 10 mSec burst occurs, the Probability of Intercept (POI) is likely only about 17% and a 1 mSec event would realize a POI of just 1.7%
  - A burst of 57 mSec (or higher) would have a 100% POI in the above example with a 20 GHz ROI at 20 kHz RBW with a sweep speed of approximately 350 GHz per second with the Signal Hound SM200A Spectrum Monitoring Receiver.

NTSC Analog Video Demodulation

Automatic Sync Pulse Detection

- NTSC video demodulation provides a check and balance method of positivity identifying analog wireless video transmitters detected during a sweep, or signals suspected of containing video content.
  - Supports the ability to demodulate Power Line Carrier (PLC) video senders.
- Enhanced Audio Oscilloscope Display (OSD)™ filtering and control capability in support of the video demodulation process.
- Large resizable video decoder window.
- IQ capture of video signal allow analytical playback.

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TEMPEST Evaluation and Video Rendering

- The ability to utilize the video demodulator to confirm the presence of unintentional radiation containing video signals or other intelligence can be confirmed.
  - The Tap Capture Plot (TCP) TM feature can be used to geo-locate TEMPEST emissions and the video decoder can be utilized to provide a visualization process.

Tactical Self-Destruct Mode (TSD) ™

OPT TSD (Restricted)

- For active deployment in potentially hostile working environments, the Kestrel TSCM ® Professional Software includes a multiple threat level Tactical Self-Destruct (TSD) ™ capability.
  - Level I
    - Removes the Activation Security Key (ASK) ™ , the application, all historical and current runtime data.
  - Level II
    - Removes the Activation Security Key (ASK) ™, and the application.
  - Level III
    - Removes the Activation Security Key (ASK) ™ only.
- The ability to remotely initiate the TSD ™ feature is supported with remote network connectivity.

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