

# *KESTREL TSCM PROFESSIONAL SOFTWARE*



## *Key Features and Operational Advantages*

*Innovation is Simply the Beginning!*

# *Key Features and Operational Advantages of the Kestrel Software*

- We are often asked of compare Kestrel<sup>®</sup> to other products.
  - Such a comparative is generally not possible given the wide range of system design criteria, undeclared specifications, computing hardware, receiver and software capability of other products.
- Kestrel<sup>®</sup> stands on its own merits, our goal and responsibility is to provide detailed information about Kestrel<sup>®</sup>, 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, focused TSCM | SIGINT specific software available.



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*Canadian  
Innovation!*

*Developed in  
Canada*

*Sold  
Worldwide*

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- 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 methodology.
- Innovation is our design methodology.
  - Industry leading, operator centric and TSCM | SIGINT specific Software Defined Radio (SDR).
- Strong Engineering Commitment and Expert Software Development Group (SDG)<sup>™</sup>.
- Engineered by Extreme Experience!
- Global industry disruptive technology | Delivered!



# *Operator Centric*

# *Engineered by Experience!*

- Kestrel<sup>®</sup> 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 44 Countries Worldwide!



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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 44 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 secure 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 your 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)<sup>™</sup>, 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 based technical support delivery on an as required basis.



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# *Simplified Software Licensing*

## *No Annual License Maintenance Fees*

- 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)<sup>™</sup> 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 provided free of charge.
- Optional generational software releases may require an upgrade fee.
  - Anticipated in 3 to 5 year generational intervals.



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# *Custom Software Features*

# *New Functionality Ready!*

- 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?



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*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<sup>®</sup> Professional Software, Signals Intelligence Support System (SISS)<sup>™</sup>.



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# *Typical Software Costing with all Options*

*\$5,675.00  
(CAD)*

- Kestrel TSCM<sup>®</sup> Professional Software | Dual Receiver
  - \$3,495.00 CAD
- Automatic Export Control (AEC)<sup>™</sup> | OPT AEC
  - \$495.00 CAD
- Command Line Programming (CLP)<sup>™</sup> | OPT CLP
  - \$495.00 CAD
- Tap Capture Plot (TCP)<sup>™</sup> | OPT TCP
  - \$495.00 CAD
- Autonomous Measurement and Collection System (AMCS)<sup>™</sup>
  - \$695.00 CAD



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# *Mission Agnostic by Design*

# *Reduces the Requirement for additional TSCM Resources*

- 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.



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*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 may 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)<sup>™</sup>.
  - 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 6 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 generic USB GPS Receiver 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.



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*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 (MMA)™ 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™*

- 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, and Differential Free Space Power Loss (FSPL).



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# *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 capability for extended signal analysis.
- IQ Conversion Utility easily converts standard CSV IQ files to Kestrel IQ (KIQ) file format.
  - Automatic Export Control (AEC)<sup>™</sup> | OPT AEC supports the ability to Trigger and Record IQ samples.
  - Command Line Programming (CLP)<sup>™</sup> | OPT CLP supports a range of audio base alerts, system driven actions, and both email and SMS alerting.
- Support for Signal Hound Spike Software IQ playback.



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# *Advanced IQ Time Reference Sub-Sample (TRS)*

## *Save IQ Clip*

- The ability to Time Reference Sub-Sample (TRS)<sup>™</sup> 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)<sup>™</sup> 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.



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# *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.
- 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)<sup>™</sup> 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).



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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 GHz, 14 GHz, 13 GHz, 18 GHz, 20 GHz, 27 GHz, 30 GHz, 32 GHz, and 43 GHz, and 50 GHz.
- Additional Kestrel Support Profiles (KSP)<sup>™</sup> 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)<sup>™</sup>.



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# *Powerline Carrier (PLC)*

# *Broadband Power Line (BPL)*

- Software profile for PLC and BPL unintentional radiator verification.
- Third-Party hardware support for PLC | BPL signal detection and characterization.
- Advanced hardware sensors and probes are currently under-development to accommodate additional testing protocols.
- Power Line Carrier (PLC) and Broadband Power Line (BPL) analysis supported.
- Pending Release;
  - Infrared (IR) Optical Modulation Detection
  - Visible Light (VL) Optical Modulation Detection.
  - Electro-Magnetic Field Density.



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# *Analog Demodulation and FFT Visualizer*

- Demodulated signal analytics ready, for AM, FM, and USB, LSB modes
- Additional analog and digital demodulators are currently under development.
  - Sophisticated signal level FFT Visualization of the IF Spectrum, IQ Diagram, IQ Vs Time, RSSI History, Analog RSSI, 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 effective with v1.42xx code.
  - 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*

- 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.



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# *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)™*

- 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.



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# *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)<sup>™</sup> 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<sup>™</sup> 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.



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# *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 and TAFL Frequency Licensing Databases included as a standard licencing 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 and TAFL databases is available for operator download
- Selective FDB zoning across both FCC and TAFL 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 or view the OSL graphical overlay is supported on the User-Interface (UI).



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# *Channel Profile Masks (CPM)™*

- Allows official bands, sub-bands, Range of Interest (ROI) to display as a graphical overlay for easy identification.
  - 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*

- 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.



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# *Multiple Instances of the Kestrel Software*

- The ability to open a second or third instance of the software permits uninterrupted collection, and historical project analysis and review, 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.



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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.



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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.



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# *Kestrel TSCM Professional Software*

## *Setup Wizard*

- 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



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# *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 Sub-Harmonic Calculator displays SOI harmonic relationships from  $1 / H_2$  to  $1 / H_9$ .
- Provides unique threat detection opportunity below the fundamental frequency.
  - Harmonic Calculator displays SOI harmonic relationships from  $H_2$  to  $H_9$  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.



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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*

- 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.



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# *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.



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# *Dynamic Alert Annunciator (DAA)*

- Real-time interactive PASS / FAIL spectrum event status monitoring 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.
- 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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# *Session Report Generator (SRG)*

# *Standard PDF Report Rendering*

- 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.



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# *Advanced Report Generator (ARG)*

## *Next Generation Feature*

- 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..



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# *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.



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# *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.



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# *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)<sup>™</sup> 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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# *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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