



## Kestrel TSCM™ Professional Software

### Signal Intelligence Support System (SISS)™

The Kestrel TSCM Professional Software takes full advantage of advanced Software Defined Radio (SDR) concepts to deliver proven industry leading, standalone RF remote spectrum monitoring, collection and analysis functionality. Work flow oriented features tailored to professional level TSCM applications and integrated into an intuitive operator centric graphical user interface, contribute to a high standard of usability. With its extensive functionality, the Kestrel TSCM Professional Software is the ultimate future-proof radio frequency sensing solution for TSCM. Our Technical Research and Standards Group (TRSG) continues to develop unique and innovative products and deployment methods. Developed in Canada, our software supports a broad range of search receivers and spectrum analyzers, and is available to technical security professionals worldwide. ✈



### Key Features

#### Graphical User Interface (GUI)

Ergonomic user interface design promotes operator situational awareness by grouping and dynamically linking essential control elements and use of intelligent automation. ✈

#### RF Spectrum Display (RSD)

Multiple spectrum tabbed window displays permit any number of frequency Ranges of Interest (ROI) to be searched in parallel. ✈

#### Waterfall Display (WFD)

Waterfall Display (WFD) and trace recording capability enables the time history of signal events to be instantly reviewed. ✈

#### Live View Analysis (LVA)™

Real-time analysis of continuous and periodic signal events is fully supported without the need to interrupt the data collection process. ✈

#### Artificial Intelligence

Our Threat Detection Algorithm (TDA) and Signal Combining Technology (SCT) accurately detects and displays wide bandwidth signals. ✈

**"Innovation is Simply the Beginning..."**

#### Demodulation and Visualization

The operator can quickly demodulate and record samples of AM, FM and SSB audio. Real-time displays include RF power spectrum, AF power spectrum, audio oscilloscope, IQ and RSSI. ✈

#### Threat Detection Algorithm (TDA)

Detection modes include, Minimum Detection Amplitude (MDA), Harmonic Signature Threshold (HST), and Chirp Threat Mode (CTM). ✈

#### Differential Signal Analysis (DSA)™

Our graphical DSA model permits the import of floor plans, vertical riser, geographical maps and photographs of the target area for direct comparative analysis of all collected data. ✈

#### Spectrum Baseline Logging (SBL)™

The technical operator can quickly capture a detailed baseline trace, and signal list. ✈

#### Session Report Generator (SRG)™

Our integrated report generator, and project management structure, provide unprecedented sophistication in a TSCM application. ✈

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## Key Features

### Graphical User Interface (GUI)

The intuitive, work-flow based operator centric interface places essential display, and control groups up-front. Dynamic control linking, artificial intelligence, and predictive logic provide optimal settings that are under full operator control during the collection, analysis and review process. ✨

### Graticule Control Group

The operator can setup, navigate, view and analyze, multiple instances of independent spectrum and waterfall trace data in a familiar tabbed window format. Various global and independent viewing preferences are supported. ✨

### Automatic Threat List (ATL)™

Two primary levels of active threat list integration and generation work intuitively to provide advanced dynamic positional zoom control, and discrete signal demodulation ability. The sidebar ATL provides immediate access to all discrete signals identified and captured, and displays the frequency (MHz) and signal level (dBm). The Master ATL window provides additional signal parameters including any identified harmonic relationships, frequency (MHz), signal level (dBm), estimated bandwidth, date and time of collection and physical location details. The operator can add identity and field notes relating to discrete signal events. Signals are placed on a uniquely colour coded tabbed window and duplicated on the Master ATL. Our **Drag and Drop** technology allows any detected signal to be demodulated or dropped onto the Graticule, to immediately activate a 20x positional zoom control focus on the Signal of Interest (SOI). The operator may further zoom up to 200x manually. ✨

### Live View Analysis (LVA)™

Real-time analysis of discrete spectral events is fully supported without interrupting the runtime collection process, giving the operator the ability to instantly review historical trace data displayed directly on the RSD and WFD (trace by trace basis) in near real-time, or during off-line post event analysis, working with a historical Kestrel Project File (KPF). ✨

### Analyzer Configuration

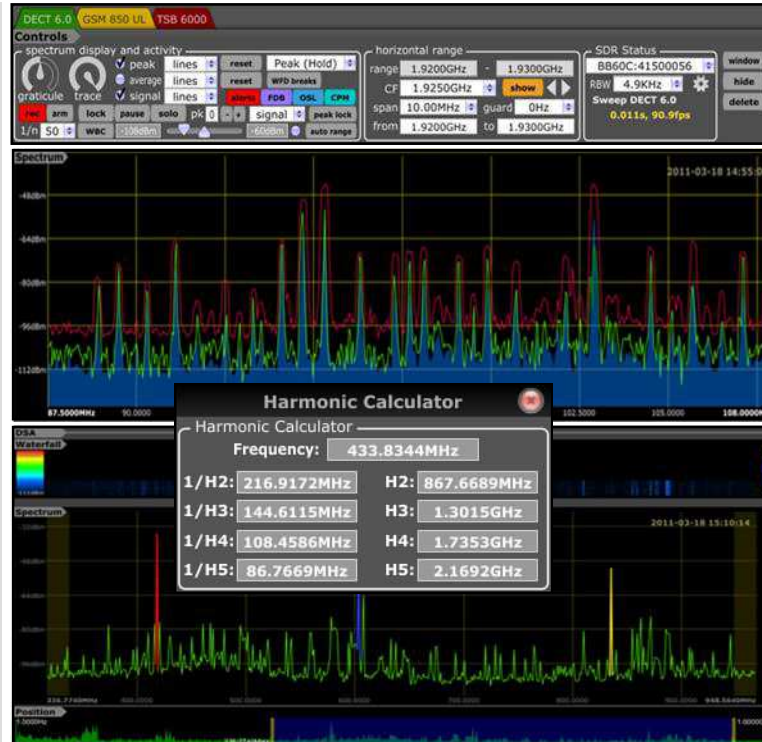
Search receivers are automatically detected and initialized during the application start-up process. User definable analyzer configuration settings enable spectrum, demodulation, and active analysis functions to be independently programmed at the receiver or analyzer level. ✨

### Kestrel Super Trace (KST)™

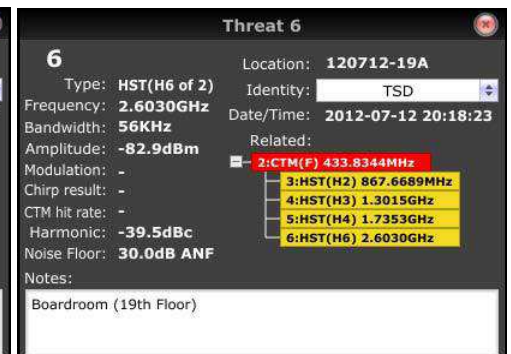
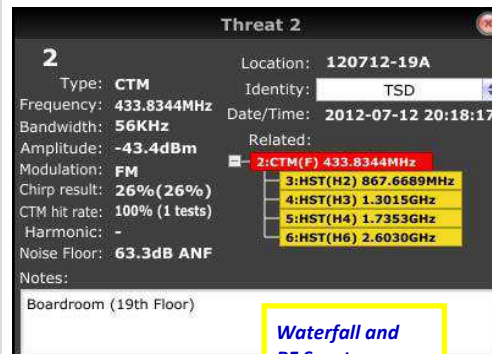
Full support is provided for time compressed spectral and waterfall displays. ✨

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Master Automatic Threat List (ATL)								
combined CTM HST MDA SOI SBL OSL								
ID	Harm	Frequency	Level	BW	Detected	Location	Identity	Notes
1	F	105.7167MHz	-60.5dBm	102KHz	2012-07-12 18:43:15	120712-19A	FM	Commercial Broadcast
2	F	433.8344MHz	-43.4dBm	56KHz	2012-07-12 20:18:17	120712-19A	TSD	Boardroom (19th Floor)
3	H2	867.6689MHz	-52.3dBm	56KHz	2012-07-12 20:18:17	120712-19A	TSD	Boardroom (19th Floor)
4	H3	1.3015GHz	-52.3dBm	56KHz	2012-07-12 20:18:17	120712-19A	TSD	Boardroom (19th Floor)
5	H4	1.7353GHz	-82.9dBm	56KHz	2012-07-12 20:18:21	120712-19A	TSD	Boardroom (19th Floor)
6	H6	2.6030GHz	-82.9dBm	56KHz	2012-07-12 20:18:21	120712-19A	TSD	Boardroom (19th Floor)



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## Key Features

### Multiple Receiver Operation (MRO)™

Single Receiver Operation (SRO), Dual Receiver Operation (DRO), and Multiple Receiver Operation (MRO), are supported with *on-the-fly* dynamic (spectrum and demodulation) *hand-off* between any number and type, of supported receivers and spectrum analyzers. ✈

### Professional Receiver Support

Kestrel Support Profiles (KSP) are available for a wide range of entry level and professional search receivers, and spectrum analyzers for virtually all TSCM and Remote Spectrum Surveillance and Monitoring requirements. ✈

### Multiple Spectral Windows

The ability of the operator to display, search and analyze any number of independent spectral range windows is supported. Multiple independent search Ranges of Interest (ROI) can be accessed on a single monitor via a familiar tabbed window interface, or moved to a second, or third display monitor. The ability to select and view any portion of a currently displayed ROI, and open a new focused zoom window, is also supported. The Kestrel | **SOLO** | priority mode, allows the operator to assign real-time priority to any single tabbed window, and immediately zoom on any discrete Signal of Interest (SOI) event. ✈

### Positional Zoom Control (PZC)

The technical operator can utilize the mouse wheel to focus and direct the desired zoom level on the spectral display. The operator may also navigate within the Positional Zoom Control (PZC) window. A double mouse click activates a 20x and 100x zoom factor. A right mouse click allows the operator to select from a list of predictive logic zoom options based on the current CF and ROI displayed. A 200x manual zoom is available to further focus attention on the SOI. *Drag and Drop* from the Automatic Threat List (ATL) focuses the SOI at CF with a 20x zoom factor. The CF, SPAN, START and STOP frequency can be set manually from the navigational control group. ✈

### Global Positioning System (GPS)

The Kestrel TSCM™ Professional Software, support for commercial USB type GPS receivers permits the capture of GPS coordinates for active DSA antenna locations in support of Geographical Area Reviews (GAR), RF Direction Finding, Search and Rescue (SAR) applications, and wireless surveys. Position coordinates may also be manually entered when a GPS signal is not available. ✈

### Receiver *Hand-Off* Capability

Dynamic *Hand-Off* is available across all supported receiver, and analyzer types. ✈

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The Kestrel TSCM™ Professional Software, *Communication Interface Protocol (CIP)*, allows operational support for a wide range of professional, receivers, digitizers, and spectrum analyzers



 <p><b>SIGNAL HOUND</b> SA-44B / SA-124B 1 Hz - 4.4 GHz 100 kHz - 12.4 GHz</p>	 <p><b>ANRITSU MS2710C SERIES</b> Spectrum Master 9 GHz / 13 GHz / 20 GHz / 32 GHz / 43 GHz</p>	 <p><b>ROHDE &amp; SCHWARZ</b> Portable Receiver EM100 3.5 GHz / 7.5 GHz</p>	 <p><b>ROHDE &amp; SCHWARZ</b> Portable Receiver PR100 3.5 GHz / 7.5 GHz</p>
 <p><b>SIGNAL HOUND</b> BB60A / BB60C 9 kHz - 6.0 GHz 20 / 27 MHz IF BW 24 GHz / Sec</p>	 <p><b>ThinkRF</b> 100 kHz - 8 GHz 100 kHz - 18 GHz 100 kHz - 27 GHz 10 / 100 MHz IF BW</p>	 <p><b>MERLIN MK3™</b> 50 kHz to 30 GHz 40 MHz IF Bandwidth</p>	 <p><b>RF Eye NODE</b> 10 MHz - 6 GHz 6 GHz - 18 GHz (BDC) 6 GHz - 50 GHz (BDC)</p>
 <p><b>TEKTRONIX</b> 9 kHz - 6.2 GHz 40 MHz IF BW</p>			

Ability to Open  
Multiple Band  
Spectral Display  
Windows



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## Key Features

### Differential Signal Analysis™ (DSA)

DSA can be utilized in several operational modes depending on deployment parameters. Static and Echo DSA modes allow the operator to collect comparative traces from any number of target area locations and overlay the trace data. Unlike standard spectrum analyzer trace math, the Kestrel TSCM™ Professional Software supports MDA, CTM and HST spectral marker flag integration. This adds an important analysis layer that significantly enhances the Probability of Detection (POD) and signal identification. ✂

### Live View DSA (LVD)™

The LVD feature enables the operator to review specific antenna location based comparative traces without interrupting the collection of DSA trace data in the background. It can be used during active DSA trace collection or during post event analysis. Full display functionality, including the Positional Zoom Control (PZC) and all display parameters, are preserved. When DSA Comparative and ECHO Mode are both active, real-time Differential Signal Analysis (DSA) is actively displayed in the DSA trace window. ✂

### Trace Math Analysis (TMA)

The ability of the operator to display a differential trace comparison for any two collection locations is supported. The DSA window supports (A - B) or (B - A) comparison modes for all available DSA antenna locations. The operator need only **Drag and Drop** any two locations to the TMA docking station to display a differential trace. ✂

### Positional Zoom Control (PZC)

The Positional Zoom Control (PZC) enables the full ROI or any SOI to be viewed in detail with a 200x zoom factor. This allows the technical operator to identify even minor amplitude or bandwidth differences. ✂

### Multiple Display Monitors

The operator can open and display, any number of independent spectral windows, across multiple receivers, and dynamically drag the windows to a separate display monitor, or view separate **Hand-off** receivers on any available display monitor. ✂

### Rapid Deployment Kit (RDK)

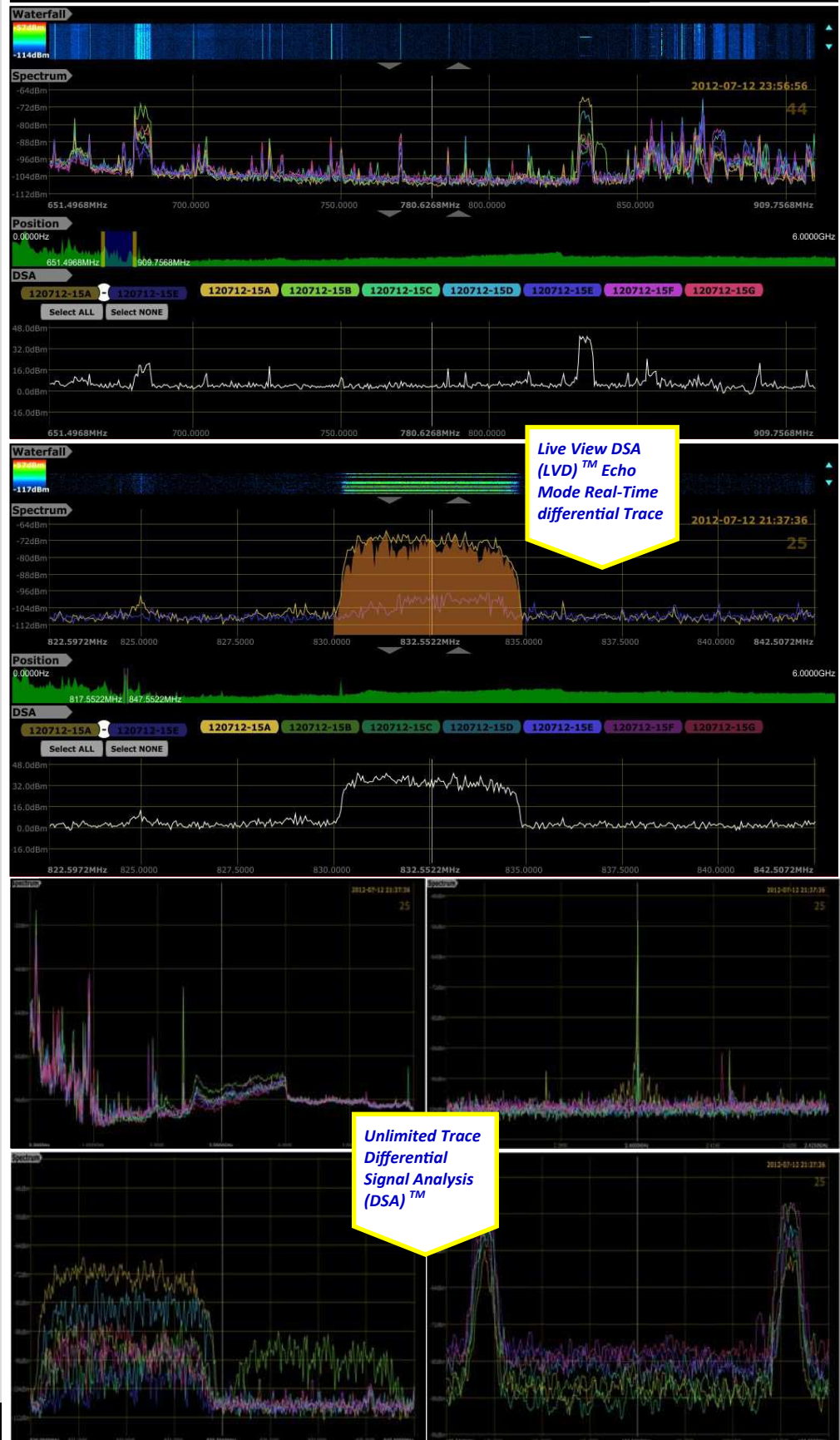
The entire Kestrel TSCM™ Professional Software, Signal Intelligence Support System (SISS) can be pre-configured, and delivered in a standard transit hard case. ✂

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## Nothing Escapes the Eye of the Kestrel



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## Key Features

### TSCM Deployment Considerations

TSCM focussed RF spectrum analysis requires innovative equipment resources, and perhaps more importantly, a comprehensive framework for applying the advanced procedures and deployment techniques needed to meet modern day threat challenges. ✈

### Floor Plan (Import)

The ability to import a (.PNG), (.JPG), or (.GIF) image of a target area, or facility level floor plan, is supported in the Kestrel TSCM™ Professional Software. Our Differential Signal Analysis (DSA) feature is integrated with antenna location spectral data collection points, and is graphically represented on the imported floor plan utilizing our Drag and Drop technology. ✈

### Vertical Riser Plot (Import)

Full support for the import of vertical riser plots allow the operator to utilize the DSA functionality to capture and display collected spectrum data from multiple levels, or floors of the target area, or facility. ✈

### Geographical Area Map (Import)

RF surveys and TSB 2000 (Technical) Standard™ based Geographical Area Reviews (GAR)™ are easily accomplished by importing any suitable map, or chart, and deploying the DSA feature from a mobile collection platform such as a vehicle, aircraft or marine vessel. It is also possible to deploy the software utilizing a series of fixed station collection points, or client locations. ✈

### Photo Realistic - Virtual Reality (Import)

Our photo realistic - virtual reality feature allows the operator to import actual target area, or facility photographs, and overlay the DSA antenna location data directly on the image. This can provide an extremely accurate graphical representation of the target area. ✈

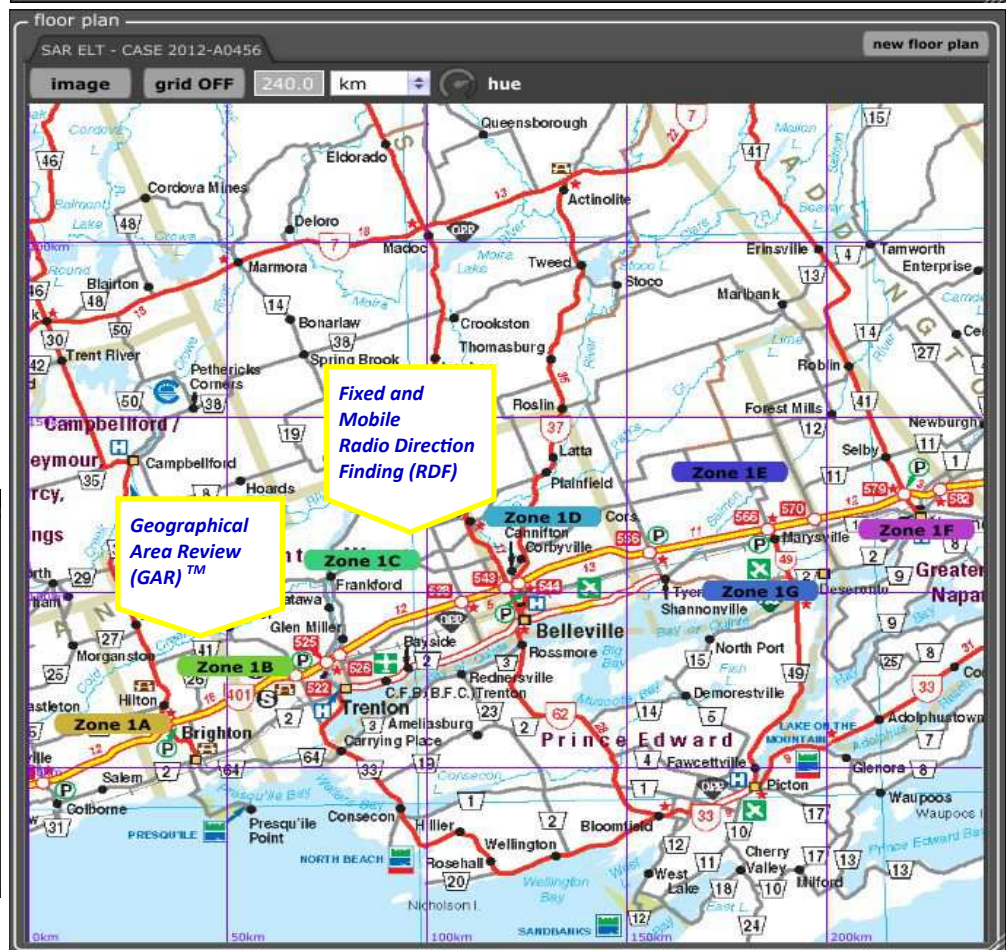
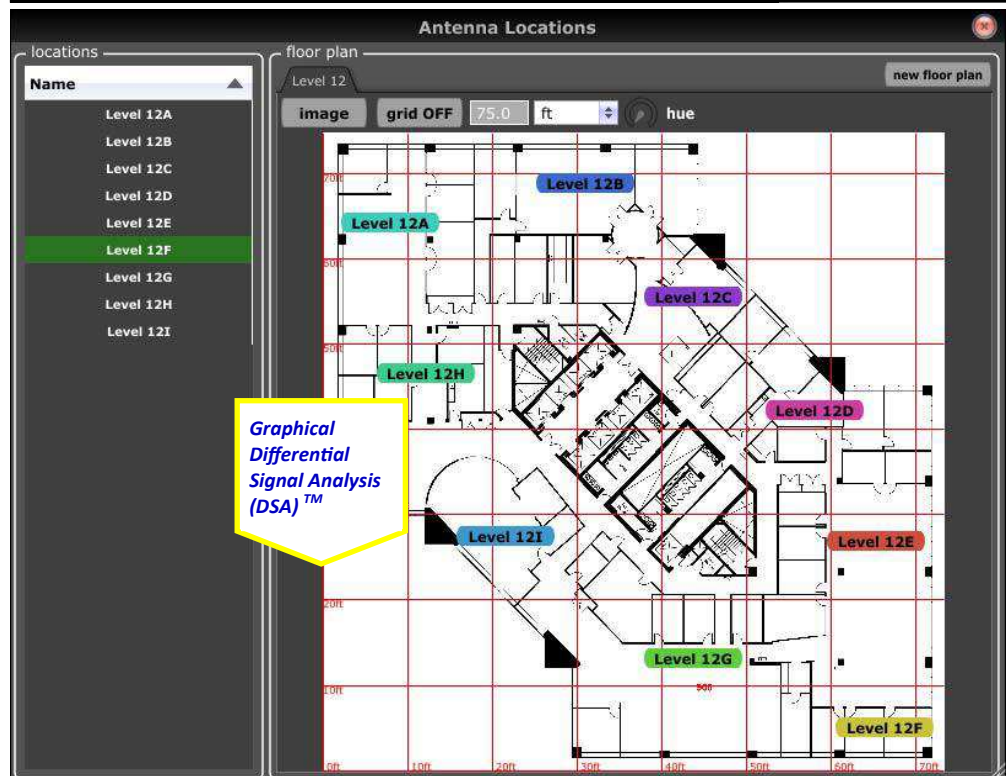
### Import Comparative Bands

The operator can import comparative spectrum trace data from any historical Kestrel Project File (KPF). ✈

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## The Small - But Mighty Kestrel



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## Key Features

### Award Winning - Industry Leading Software

The Kestrel TSCM™ Professional Software, is the first in its class to provide *on-the-fly* multiple receiver *hand-off* of the spectrum and demodulated signal events, to other supported receivers, or analyzers. ✈

### Awards

The Kestrel TSCM™ Professional Software is the recipient of the CTSC 2013 and CTSC 2014 Software Defined Radio (SDR), Innovation, Research and Development excellence award. It also received the Espionage Research Institute International (ERII) Glenn H. Whidden Award for the Best New TSCM Product at the 2013 ERII Counterespionage Conference. ✈

### Operator Centric Design

Designed from the outset to support Multiple Receiver Operation (MRO), the Kestrel TSCM™ Professional Software enables the operator to exploit the full potential of any number and combination of supported receivers and analyzers. Using independent tabbed windows, the operator can sweep any number of independent (active or standby) spectrum band allocations, or custom frequency Ranges of Interest (ROI), across any number of receivers or analyzers. The ability of the operator to *hand-off* spectrum band allocations *on-the-fly*, facilitates uninterrupted dynamic *hand-off* to another connected device. Our dynamic *hand-off* synchronization provides instantaneous connectivity, without data loss during the *hand-off* process. ✈

### Proven Experience

Our software was conceived, and developed in Canada by TSCM professionals with 35+ years of operational field experience in delivering TSEC / TSCM professional services at all operational threat levels. The all-encompassing experience of our company principals forms the basis of the TSB 2000 (Technical) Standard™ and the TSCM Operational Standard Policy and Procedure Guideline (OS-PPG)™. Our Software Development Group (SDG), and Technical Research and Standards Group (TRSG), have applied a common-sense and balanced approach centred on the TSB 2000 (Technical) Standard™ for designing and assimilating complex algorithms, artificial intelligence and Digital Signal Processing (DSP) technologies. This knowledge and experience is reflected in the successful development of an RF detection, collection, surveillance, and monitoring system that is both powerful and easy to use by operators at any experience level. The Kestrel TSCM™ Professional Software is suitable for TSCM deployment at all known and developing threat levels. ✈

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## Nothing Escapes the Eye of the Kestrel

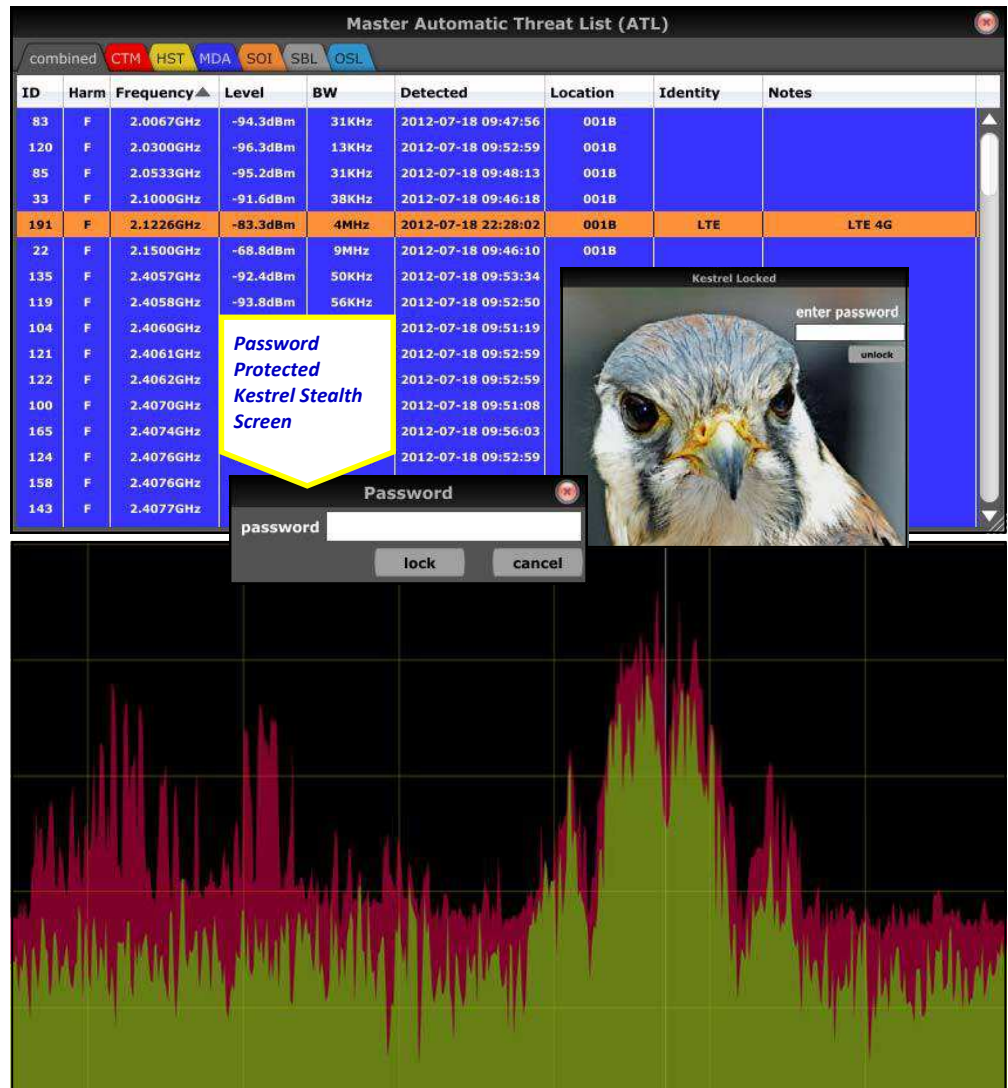
### Kestrel TSCM™ Professional Software

New technology requires new terminology, and operators will soon become familiar with, and recognize the level of sophisticated simplicity, workflow integration, and the wide ranging deployment benefits of our Automatic Threat List (ATL), Positional Zoom Control (PZC), Live View Analysis (LVA), Live View DSA, Differential Signal Analysis (DSA), Spectrum Baseline Logging (SBL), Chirp Threat Mode (CTM), Harmonic Signature Threshold (HST), Minimum Detection Amplitude (MDA), Signal Combining Technology (SCT), Threat Detection Algorithm (TDA), RF Spectrum Display (RSD), Waterfall Display (WFD), Dynamic Alert Annunciator (DAA), Kestrel Graphical Mapping (KDM), Harmonic Calculator Tool, Image Capture Tool (ICT), Demodulation, and FFT Visualization, and other forward-thinking, operational deployment features and functionality, with new features included with each software release. ✈

### Key Deployment Benefits

The combination of the Kestrel TSCM™ Professional Software and an application specific receiver or analyzer, becomes part of a modern, TSCM optimized work-flow oriented, Signal Intelligence Support System (SISS)™. Our cost-effective state-of-the-art RF collection and analysis technology approach, provides a comprehensive suite of TSCM focussed capabilities:

- Signal detection, collection and analysis;
- Demodulation and Visualization
- Unattended and real-time, remote spectrum surveillance and monitoring;
- Automatic project file save;
- Fail-safe defensive code integration and recovery; and
- A fully integrated Session Report Generator (SRG). ✈





## Key Features

### Frequency Database (FDB)

The Kestrel TSCM™ Professional Software includes an Advanced Signal Intelligence Database (ASID) that encompasses a number of essential component features, such as our Frequency Database (FDB), and Operator Signal List (OSL). The operator has the ability to overlay official Industry Canada and FCC licensing data directly on the Graticule, providing an excellent visualization of spectrum allocations for the geographical region of interest, which can be as large as North America, country wide, or as specific as a city or region. This enables the operator to quickly identify known emitters licensed within the geographical area. The operator can define the search query for emitters at arbitrary distances referenced to a GPS fix or manually entered geographical coordinates. A query based on Free Space Propagation (FSP)™ RSSI values within a search range of (-20 dBm to -90 dBm) is also supported. Custom user defined OSL files can also be created and displayed. ✂

Image ① illustrates a spectral Range of Interest (ROI) containing a confirmed CTM fundamental frequency and associated 2nd, 3rd and 4th harmonic signatures. The operator can open one or more FDB files to initiate a search, and view location specific signal parameters for any ROI. ✂

Image ② illustrates FDB data displayed across a Range of Interest (ROI) extending to 6 GHz based on an FDB Query of 5 NM and FSP levels of -90 dBm, or higher. The operator initiated query, returned 1,481 signal events across one spectrum band from three active FDB database files. ✂

Image ③ illustrates FDB data displayed across a (3 GHz) Range of Interest (ROI), identifying overlapping and adjacent FDB data. The ability to zoom in and expose expanded frequency specific FDB data, and select and display specific Frequency Database (FDB) details provides unsurpassed signal intelligence capability. ✂

Image ④ illustrates the FDB List window, as displayed when the operator utilizes a right mouse click on any of the FDB frequency marker overlays, where frequency data is overlapping, based on geographical distance priority. ✂

Image ⑤ illustrates the FDB Entry window, as displayed when the operator utilizes a right mouse click on a single FDB marker or selects a signal from the FDB List. It is possible to determine the distance, bearing, and FSP specific to each defined DSA antenna location. Specific information displayed from the official licensing databases provides useful insights into the ambient RF spectrum environment. ✂

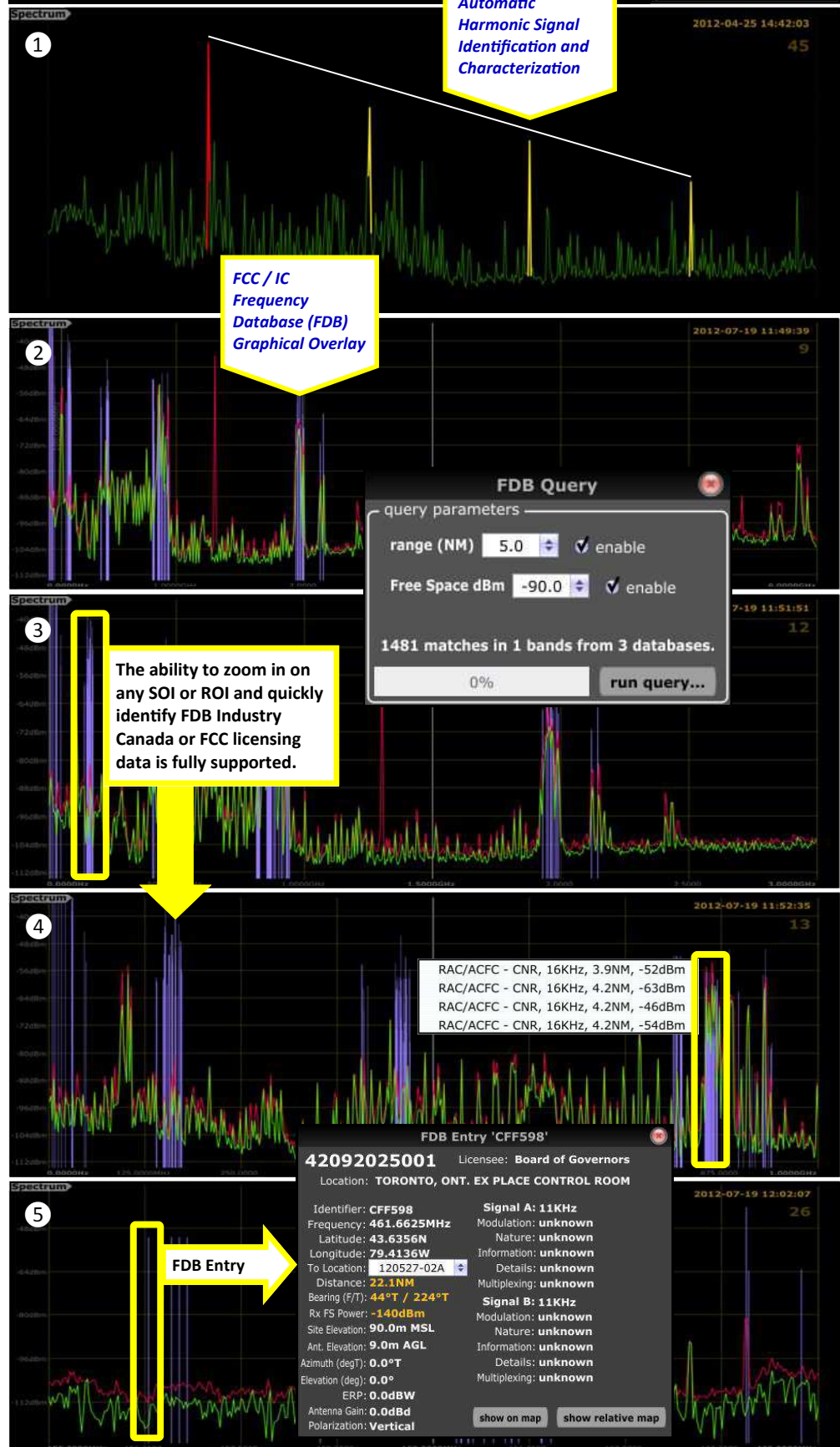
*Kestrel TSCM supports most commercially available, GPS modules with USB interfaces and supports the manual entry of Latitude and Longitude coordinates.*

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## Due Diligence is at its Best - Under the Wings of the Kestrel







## Key Features

### Advanced Signal Intelligence Database (ASID)

The ability to search our Frequency Database (FDB), either geographically by radius distance expressed in Nautical Miles (NM), referenced to the current collection DSA antenna location, or by Free Space Propagation (FSP)™ estimates, for signal levels (or both), is fully supported. It is possible to view FSP data (relative power levels) as a graphical overlay, directly on the Graticule during real-time collection, and during post event analysis and review of historical Kestrel Project Files (KPF). The 'FDB Entry' dialog window displays the distance, bearing, and Rx (FSP) Power level and provides the technical operator with the ability to directly export, and display the 'FDB Entry' on Google Maps, Satellite and Street View. The ability to display, and save a relative static overview map showing both the Tx and Rx reference locations is also supported. ✎

### FDB Update Server

Periodic Frequency Database (FDB) updates are available for download free of charge to licensed operators, from the password protected Technical Support Group (TSG) Resource Centre website. The operator may either download the entire FDB regional or national frequency file sets, or download a specific FDB file of interest on demand during deployment via any available Internet access point. Internet access is required for FDB file download and for access to online mapping resources. ✎

### Operator Work-Flow

The ambient RF spectrum represents a very complex and challenging work environment for the operator. The ability to separate what often amounts to many thousands of 'friendly' ambient signal events from perhaps the one difficult to detect 'hostile' Signal of Interest (SOI) significantly increases the Probability of Detection (POD) during active deployment. The ability to verify and dismiss with confidence benign signals is of considerable practical value. This capability is further enhanced by the ability to populate, load, and display a custom Operator Signal List (OSL) designed to span multiple Kestrel Project Files (KPF). Multiple, custom OSL files can be maintained for use within the application by category, location, or operator. ✎

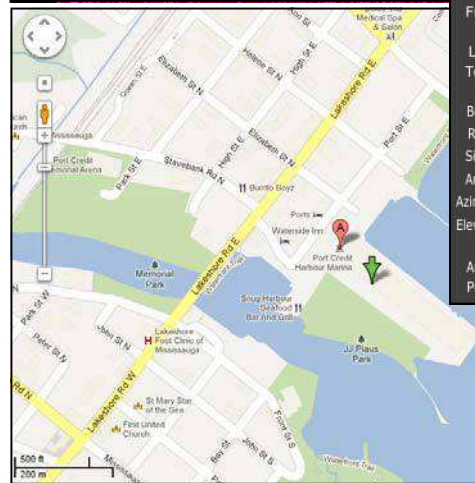
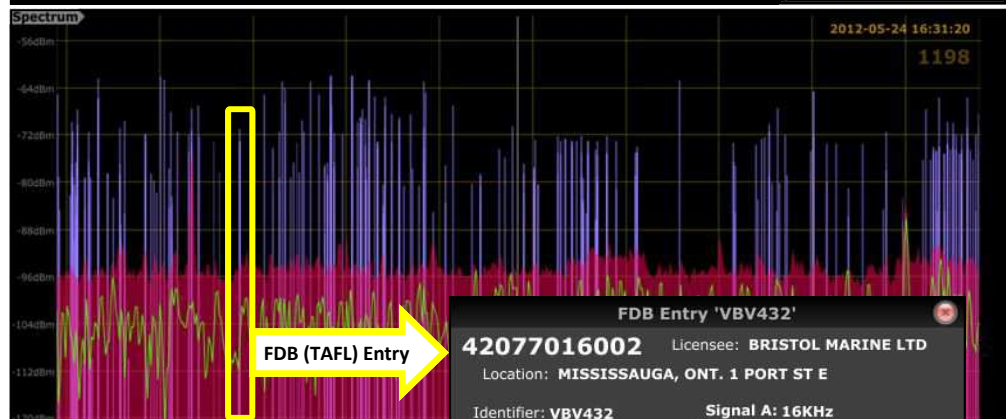
### Operator Signal List (OSL)™

The Kestrel TSCM™ Professional Software, Operator Signal List (OSL), is an important spectrum management component of the Advanced Signal Intelligence Database (ASID), and a user-defined database component list that spans multiple, Kestrel Project Files (KPF), and is therefore independent of any particular Kestrel Project File (KPF). Multiple OSL databases can be customized and maintained. An entry on the OSL, is prompted from an operator defined, signal event, for inclusion within the current OSL database file, and may be recalled, and displayed against the real-time, or a historical Kestrel Project File (KPF), during post analysis and review. ✎

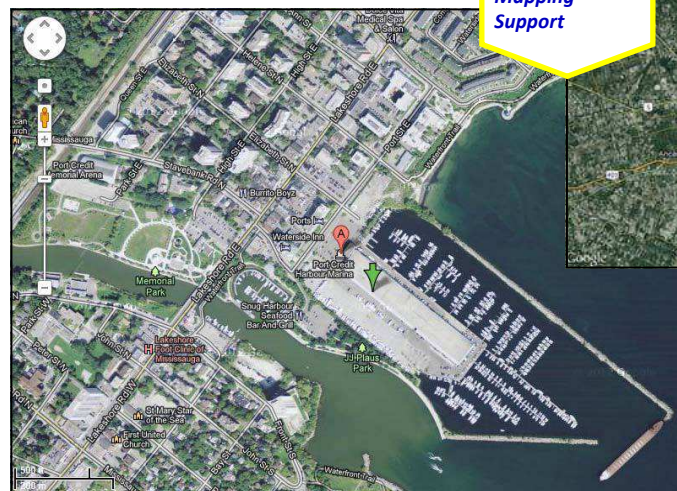
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## Get a Bird's Eye View of Signal Events



Open Source  
Geographical  
Mapping  
Support



### Kestrel TSCM™ Professional

The Kestrel TSCM™ brand is responsive to the needs of the end-user. The advanced software engineering, unique design, and innovative concept of the Kestrel TSCM™ Professional Software has become the standard, against which other TSCM software applications will be evaluated in the future. ✎

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Kestrel TSCM™ Professional Software Advancing the Art and Science of Technical Security





## Key Features

### Unprecedented Innovation

The Kestrel TSCM™ Professional Software includes significant new deployment tools. Operator centric, and designed by experienced technical operators, these tools provide unprecedented collection and analysis capabilities. ✨

### Channel Profile Mask (CPM)

The generation of "on-the-fly" channel and band oriented, Channel Profile Masks (CPM) is fully supported utilizing our CPM editor. Multiple CPM files may be operator generated, maintained and recalled during runtime, copied to a new file and imported from an operator defined (.CSV) file. The ability to display overlapping channel masks or band allocations is also supported. Operator programming includes the Center Frequency (MHz), Bandwidth (MHz) and Rx Power (dBm), or arbitrary display amplitude (dBm). The CPM database includes the ability to assign a "name" and "class" entry tag. The database file is easily moved to another host computer running the Kestrel TSCM™ Professional Software. Channel Profile Masks (CPM) are displayed by activating the | CPM | button located within the Spectrum Display and Activity control group. The CPM database editor and file management tools are located in the | SPECTRUM | menu structure. ✨

### Sub-Harmonic / Harmonic Calculator

The ability to quickly predict harmonic, sub-harmonic frequencies and correlate these with observed spectral events supports the identification of potential spectral threat characteristics. Provisions are included for the demodulation of any Automatic Threat List (ATL), fundamental frequency or 2nd, 3rd, 4th, or 5th order, sub-harmonic, or harmonic signal event. "Drag and Drop" functionality directly to / from the demodulator frequency window, the sidebar ATL or the Master Automatic Threat List (ATL), to / from the Harmonic Calculator dialog window is also supported. ✨

### Spectrum Band (Status)

Colour coded tabs support operator situational awareness with immediate status verification:

- **RED** indicates that no receiver is assigned for the band allocation.
- **YELLOW** indicates that a receiver, or analyzer is assigned, and collection is currently paused.
- **GREEN** indicates, active runtime search activity in the band allocation.

All significant status visualizations are intuitively positioned on the Graphical User Interface (GUI) and enhance situational awareness. ✨

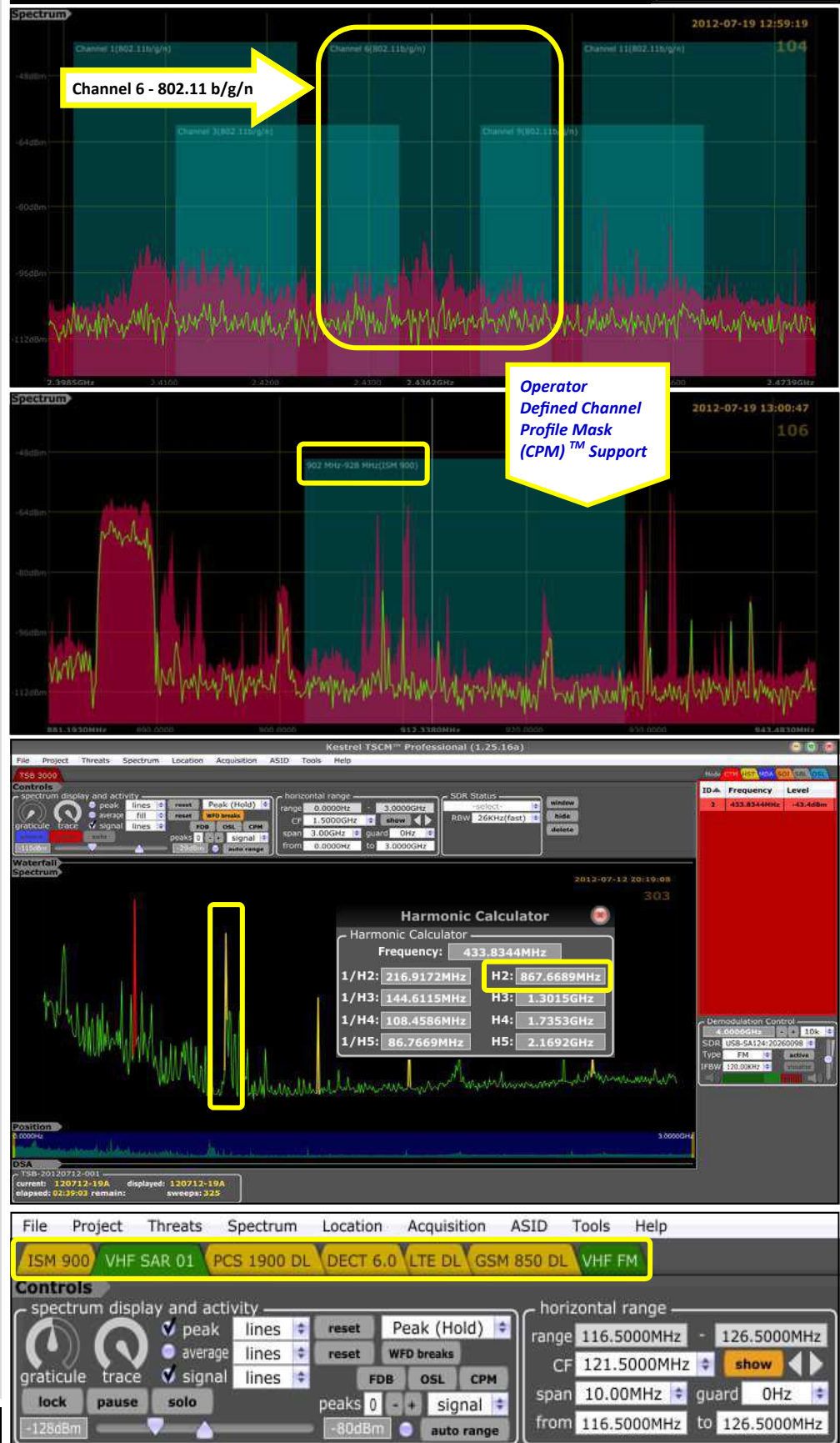
*Some of the innovative Kestrel TSCM™ features reflect comments and suggestions received by our Software Development Group (SDG) from various technical operators.*

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## Get a Bird's Eye View of Signal Events





## Key Features

### Operator File / Write Management

The Kestrel TSCM™ Professional Software can capture and record all spectrum trace data in real-time (n=1), or programmed to capture spectrum trace data at a record rate (n=2, n=5, n=10, n=20, n=50, n=100) specified by the technical operator. Default recording is set for real-time, (n=1) for fail-safe deployment. On-the-fly alert only based recording is supported for optimal write file management. ✎

### Spectrum Analyzer Mode

An advanced recording and file management mode allows the technical operator to run the software in a spectrum analyzer mode, without recording any spectrum data. If a potentially hostile Signal of Interest (SOI) is observed, the operator can quickly enable the trace recording functionality to initiate the capture of real-time spectrum trace data. This mode of operation results in a significant file size reduction since only the selected spectrum trace data is recorded. ✎

### File Size Management

To accommodate managed remote spectrum surveillance and monitoring assignments, incremental spectrum recording is fully supported. The operator is able to set the capture rate, from real-time (n=1) to incremental (n=100) recording. Basically, for n=100, 99 peak capture traces are represented as a single Kestrel Super Trace (KST)™. This processing identifies and uses the spectral peak energy that occur over the (n=?) time interval, so that significant spectral events are preserved. WFD compression enables a file size reduction up to 100 times the real-time recording value, with only a very minor displacement in time accuracy. ✎

### Dynamic Alert Recording

The ability to automatically capture and record trace data, based on operator defined alerting zone levels, at either the band or discrete signal level, is supported. This feature not only captures the triggered signal event, but also the trace data for periods up to 60 seconds before and after the beginning and end of the signal event. This mode of operation reduces the file size by orders of magnitude compared to the real-time value, as only the traces associated with specific alerting events are captured and recorded. ✎

### Dynamic Alert Annunciator (DAA)

The ability to capture DAA signal list data events that either exceed, or drop below the operator defined detection parameters, are delineated by alert zone, with, or without recording trace level spectrum data is fully supported by the Kestrel TSCM™ Professional Software. ✎

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## Get a Bird's Eye View of Signal Events



The Kestrel TSCM™ Professional Software includes, as a standard feature, a sophisticated Dynamic Alert Annunciator (DAA), as a single resource, to capture and log signal level exceedance and signal loss events. Our DAA recording control has proven to be a very powerful operator centric feature, adding an entirely new dimension to the collection, and discrete signal analysis process. Focused analytical statistics for each signal event provide a clear picture of signal characterization patterns and signatures. ✎

**Dynamic Alert Annunciator (DAA)**

Alert Tone

- ☒ Signal alert tone Select test
- ☒ Clear alert tone Select test

Alert Control

- ☒ Enable Alarms

Reset Auto 5s Operator Reset

Name	Location	Date/Time	Freq	Level	Duration	BW
TSEC-01	140131-02A	2014-01-31 00:50:30	2.4132GHz	-61.0dBm	0.594	13MHz
TSEC-01	140131-02A	2014-01-31 00:50:34	2.4110GHz	-59.0dBm	0.257	7MHz
TSEC-01	140131-02A	2014-01-31 00:50:34	2.4057GHz	-62.3dBm	0.267	5MHz
TSEC-01	140131-02A	2014-01-31 00:50:43	2.4069GHz	-62.8dBm	0.258	5MHz
TSEC-01	140131-02A	2014-01-31 00:50:44	2.4062GHz	-63.5dBm	0.298	6MHz
TSEC-01	140131-02A	2014-01-31 00:50:45	2.4087GHz	-58.4dBm	0.250	3MHz
TSEC-01	140131-02A	2014-01-31 00:50:47	2.4051GHz	-63.6dBm	0.256	4MHz

**Dynamic Alert Annunciator (DAA)**

**SIGNAL THRESHOLD ALERT**  
2.4145GHz  
-58dBm  
2014-01-31 00:52:31

Alert Tone

- ☒ Signal alert tone Select test
- ☒ Clear alert tone Select test

Alert Control

- ☒ Enable Alarms

Reset Auto 5s Operator Reset

Name	Location	Date/Time	Freq	Level	Duration	BW
TSEC-01	140131-02A	2014-01-31 00:50:30	2.4132GHz	-61.0dBm	0.594	13MHz
TSEC-01	140131-02A	2014-01-31 00:50:34	2.4110GHz	-59.0dBm	0.257	7MHz
TSEC-01	140131-02A	2014-01-31 00:50:34	2.4057GHz	-62.3dBm	0.267	5MHz
TSEC-01	140131-02A	2014-01-31 00:50:43	2.4069GHz	-62.8dBm	0.258	5MHz
TSEC-01	140131-02A	2014-01-31 00:50:44	2.4062GHz	-63.5dBm	0.298	6MHz
TSEC-01	140131-02A	2014-01-31 00:50:45	2.4087GHz	-58.4dBm	0.250	3MHz
TSEC-01	140131-02A	2014-01-31 00:50:47	2.4051GHz	-63.6dBm	0.256	4MHz
TSEC-01	140131-02A	2014-01-31 00:52:23	2.4116GHz	-56.2dBm	0.258	7MHz
TSEC-01	140131-02A	2014-01-31 00:52:24	2.4051GHz	-58.9dBm	0.262	1MHz





## Key Features

### Kestrel Event Recording Mode (ERM)

The Advanced Signal Intelligence Database (ASID) is an innovative and evolving development milestone. The Kestrel TSCM™ Professional Software includes a fully automated alert, based recording control. Intuitive artificial intelligence and design level predictive logic enable our software to begin active alert zone capture and storage recording processes ahead of the signal events appearance in the spectrum. The Great Kestrel utilizes keen eyes, a photographic memory, and maybe even a little psychic ability to produce a clear picture of any alert zone based capture, and trace level recording of any Signal of Interest (SOI), leading up to its appearance, for the duration of the event, and for a period of time beyond the active alert. This innovative feature permits the technical operator to build a detailed picture of the ambient RF spectrum environment leading up to the Signal of Interest (SOI) alert. Consequently, all new and periodic signal events are well documented and available for post event analysis and review while economizing on storage requirements. In addition to performing continuous capture and recording for the duration of the event, it is possible to record up to 60 seconds of real-time trace data before the beginning of any signal event and for a similar period beyond the end of the alerting event. ✈

### Kestrel Analysis and Review Mode (ARM)

This feature provides significant operator flexibility and programmability, while providing for a measure of active file size management. The operator can deploy the system in a basic Spectrum Analyzer (SA) mode without storing any spectrum, trace, or waterfall data while maintaining the ability to actively review the current trace level data on the Graticule in real-time. There is a | **RECORD** | control located on the Spectrum Display and Activity control group that | **STARTS** | and | **STOPS** | the write process on-the-fly. The technical operator may initiate the | **START** | and | **STOP** | write process at any time on demand during runtime as may be required. ✈

### Signal List (.CSV) Data Export

The ability to export standardized (.CSV) signal list data for any automatically captured, or manually entered signal event is fully supported. It is also possible to export the CTM, HST, MDA, SBL, SOI, OSL and DAA signal lists. ✈

*Kestrel TSCM supports operator defined spectrum profiles, and rapid deployment, project templates, and supports positional zoom (up to 200x) for detailed analysis, and precise signal parameter measurements.*

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## Innovation from Theory to Practice

### Session Report Generator (SRG)

The Kestrel TSCM™ Professional Software includes the ability to export a variety of elements for inclusion within session reports. The Session Report Generator (SRG) provides the technical operator with the ability to generate comprehensive reports that include all aspects of the runtime session, including spectrum plots of the entire Range of Interest (ROI) and selectable signal list data. ✈


Session Report Generator (SRG)

cover page

document title: TSB-20140131-001

prepared by: Paul D Turner, TSS TSI

location: Toronto

cover logo: 

select

clear

executive summary

The following data represents the ambient RF spectrum captured within the client's facility during our Technical Security (TSEC) inspection. All signal events were reviewed by the technical operator and determined to be of a friendly nature.

load from text file

tables

☒ Project Data ☒ CTM Data ☒ SOI Data

☒ Project Locations ☒ HST Data ☒ SBL Data

☒ Project Bands ☒ MDA Data ☒ Ignored Signals

labels

document sensitivity

CONFIDENTIAL

images

File	Location	Caption
2014-01-21-13MP-F 001.JPG	140131-02A	Unprotected BIX Demarcation
2014-01-21-13MP-F 009.JPG	140131-02A	Fibre-Optic Demarcation

spectral data selection

locations

select then click '+'

140131-02A

bands

select then click '+'

TSB 6000

spectrum image controls

☒ Add Full ROI Plot Minimum Width: 25MHz Guard Band: 5%

☒ Auto-scale Maximum Plots: 500 Plots per Page: 4 up (no WFD)

create done

### Typical Deployment Applications

Kestrel TSCM™ Professional Software is an ideal platform for a wide range of RF applications.

- Radio Frequency (RF) TSCM Inspections
- Long-term, Managed Remote RF Spectrum Surveillance and Monitoring
- Protective Operations
- Spectrum Utilization and Management
- Spectrum / Signal Integrity, Compliance and Verification
- Spectrum Baseline Logging (SBL)
- Tactical Intelligence Gathering
- Search and Rescue, Radio Direction Finding (RDF)
- Technical Surveillance Device (TSD), Analysis and Characterization. ✈

### Dynamic Alert Annunciator (DAA)

The ability to capture operator defined alert zone data within the DAA Signal List structure is fully supported, even when the trace recording control is not enabled. The DAA Signal List can be exported as a (.CSV) file for comparative analysis, storage, or for use with third-party productivity programs, such as Microsoft Excel. ✈

### Active File Size Management

In order to facilitate operational deployment file size management considerations, the | **REC** | control group also includes an advanced write control capability (1 / n) = | **1** | **2** | **5** | **10** | **20** | **50** | **100** | option list, that represents the actual number of recorded traces that occur during runtime capture with (n=1) being real-time and (n=20) representing (1) in (20) traces being written to the local, or network storage device + peak data. ✈

### Kestrel Project Template (KPT)

The technical operator can create any number of Kestrel Project Profile (KPP) directly, from the included Kestrel Project Template (KPT) tool. Any number and type of deployment profiles can be created by the technical operator, edited, stored, and recalled, for common deployment parameters, and strategies. The ability to pre-configure a working template for different physical locations, or collection and analysis parameters, is fully supported within the Kestrel TSCM™ Professional Software. The current Kestrel Project File (KPF) can also be saved as a Kestrel Project Template (KPT). The KPP database file is easily transportable to another computer. This feature is in keeping with our operator centric, work-flow oriented philosophy, and provides a very powerful resource. ✈



## Key Features

### Deployment Flexibility

Standard included features and functionality ensure that the Kestrel TSCM™ Professional Software is deployment ready at all known and developing threat levels and encompasses the widest possible deployment requirements of professional operators. ✈

### Typical Configuration

The Kestrel TSCM™ Professional Software is designed to run on the Windows OS, for deployment on a suitable Laptop computer. Our software supports search receiver connectivity using USB 2.0, USB 3.0, and Fiber-Optic interfaces. Optional virtual LAN and Fiber-Optic modules permit USB 2.0 / USB 3.0 search receiver connectivity to be managed remotely over Cat 5e or Cat 6 LAN cabling, or multi-mode 50 / 125 Fiber-Optic infrastructure. Remote Desktop functionality permits full command and control via a direct LAN or Internet connection, including 3G / 4G / LTE cellular modems. ✈

### Licensing Options

Our standard licensing agreement includes one full version of the Kestrel TSCM™ Professional Software, and two Activation Security Keys (ASK), for use with any two supported receivers or analyzers, across two independent host computer installations. Our software activation is machine and hardware specific requiring an Activation Security Key (ASK) for each individual system (host computer and receivers). Adding an additional receiver, requires the purchase of an additional Activation Security Key (ASK). Multiple License Management (MLM) is available to meet the needs of larger organizations. ✈

### Software Updates

Software updates are provided free of charge for a period of at least one year, within the same software generation. The latest software release is always available for download, from the password protected Technical Support Group (TSG) Resource Centre website. Additional tools and resources are also available for download, including the FDB spectrum licensing database for Canada, and the United States of America. We have also provided a range of SPF, CPM, and OSL file examples. ✈

### Technical Support Group (TSG) Resource Centre

Several layers of technical support are provided by our team of Technical Support Group (TSG) specialists, including, our online (password protected) TSG Resource Centre, a comprehensive Software Programming and Operation Manual (SPOM), unlimited Email, and TeamViewer™ based technical support assistance. We also offer a 3-day Technical Operator Certification training program, and an optional annual maintenance support agreement with telephone support. ✈

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## Get a Bird's Eye View of Signal Events

Supported Receiver Type	Primary Connectivity	Optional Connectivity
SIGNAL HOUND SA44B	USB 2.0	LAN
SIGNAL HOUND SA124B	USB 2.0	LAN
SIGNAL HOUND BB60A	USB 3.0	FIBER-OPTIC
SIGNAL HOUND BB60C	USB 3.0	FIBER-OPTIC
ANRITSU SPECTRUM MASTER	LAN	USB 2.0
ROHDE & SCHWARZ EM100	LAN	
ROHDE & SCHWARZ PR100	LAN	USB 2.0
TEKTRONIX RSA306-USB	USB 3.0	FIBER-OPTIC
CRFS RFEYE	LAN	
CRFS NEXUS	LAN	
MERLIN MK3	EMBEDDED	LAN
THINKRF WSA5000	LAN	

### Kestrel LAN Remote (KLR)™

The Kestrel LAN Remote (KLR), provides virtual Gigabit Ethernet Network support, when utilizing a Kestrel TSCM™ Professional Software supported search receiver, or analyzer with a USB 2.0 interface. The KLR hardware module, allows the technical operator to control remotely located receivers and other USB 2.0 devices, directly via a virtual Gigabit LAN connection over a Cat 5e or Cat 6 network cable. The KLR hardware module is an excellent option when the host computer is not equipped with a sufficient number of USB 2.0 ports, or if the search receiver needs to be located at a distance from the host computer beyond the maximum cable length supported by the USB 2.0 interface specification. The KLR leverages the existing LAN infrastructure to provide useful flexibilities for deploying search receivers for the most effective site coverage. ✈

### Fiber-Optic Remote™

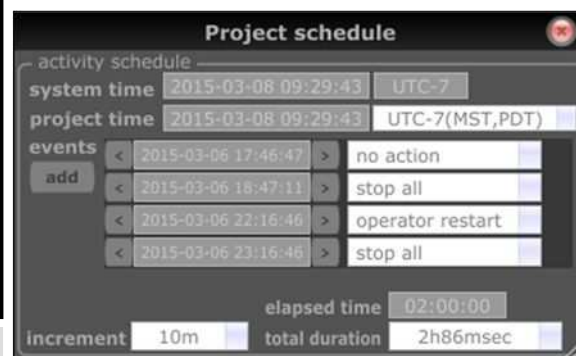
Support for USB 2.0 and USB 3.0 Fiber-Optic Remote modules utilizing Multi-Mode Fiber-Optic connectivity provides additional options for remote receiver operation. ✈

### Dynamic Alert Annunciator (DAA)™

The DAA provides visual and audio alerting capability for new or periodically occurring signal events that exceed a custom detection sensitivity level assigned to each active alert zone by the operator. Loss of signal detection and logging are also supported. ✈

### Project Activity Scheduler

Kestrel TSCM™ Professional Software includes a uniquely versatile project activity scheduler that provides the ultimate control over the runtime collection process. The ability to individually schedule runtime activity across multiple search receivers and analyzers, is only the beginning. Full activity scheduling support is provided at the spectrum band level, giving the technical operator the ability to easily program complex multiple start and stop activity across multiple, independent spectrum band allocations on each connected device. Programming is accomplished from the Setup Wizard, or later within the application during runtime. Our time zone offset provides accurate spectral time-stamping without the need to change the host computer clock. ✈



**SIGNAL  
THRESHOLD  
ALERT**  
833.4936MHz  
-108dBm  
2013-04-06  
19:51:18





## Key Features

### Audio Demodulation and Analysis

The Kestrel TSCM™ Professional Software provides a fully supported capability for demodulating AM, AM-USB, AM-LSB and FM, analog Signals of Interest (SOI). Our "drag and drop" technology allows any signal list event, to be dropped directly to the demodulation control group, from various locations, including any signal list, the Dynamic Alert Annunciator (DAA), and Harmonic Calculator Tool. ✂

### Kestrel Demodulation Visualizer

The demodulation visualizer includes a real-time RF Spectrum Display (RFD), IQ Display (IQD), RSSI History Display (RHD), and analog RSSI Display (ARD). An Audio Oscilloscope Display (AOD), and AF Spectrum Display (ASD) visualizes baseband signal representations including any sub-carriers present. Controls are provided for squelch, volume and audio muting. ✂

### IF Filter Control (IFC)

During the demodulation process, options are presented for dynamically generated baseband filter options compatible with the currently selected IF Bandwidth (IFBW). The filter value is visually displayed within the AF Spectrum Display (ASD) and applied to the demodulated audio stream. ✂

### Kestrel Wave Recorder (KWR)

The Kestrel Wave Recorder (KWR) permits the technical operator to record audio samples for further technical analysis, inclusion in reports, and for training purposes. ✂

### RSSI Tone Locator (RLT)

The RSSI Tone Locator (RLT) provides an amplitude sensitive audio alert tone that can be utilized independently, or simultaneously over the originating audio, for locating the emitter. ✂

### Demodulation Hand-Off

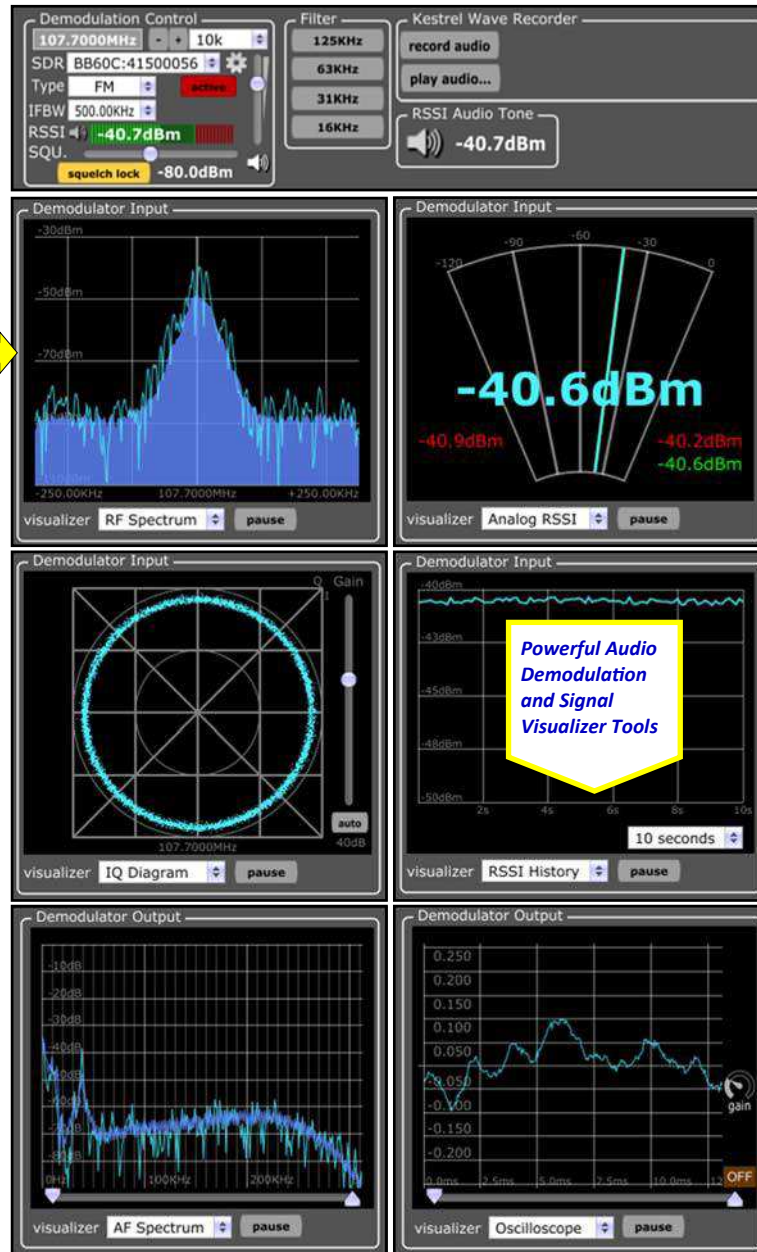
The ability of the technical operator to dynamically "hand-off" the demodulation process to any other supported and connected search receiver, or analyzer is fully supported. This allows the technical operator to utilize a dedicated, receiver, or analyzer, for the demodulation and analysis process, while allowing the search receiver to continue the uninterrupted capture of spectrum data. ✂

### Communication Receiver Mode (CRM)

The normal practice is to establish a Kestrel Project File (KPF), and then demodulate any Signals of Interest (SOI) from within the runtime environment. However, it is also possible to simply open the application window, and directly enter the Center Frequency (CF) of interest and activate the demodulation process. ✂

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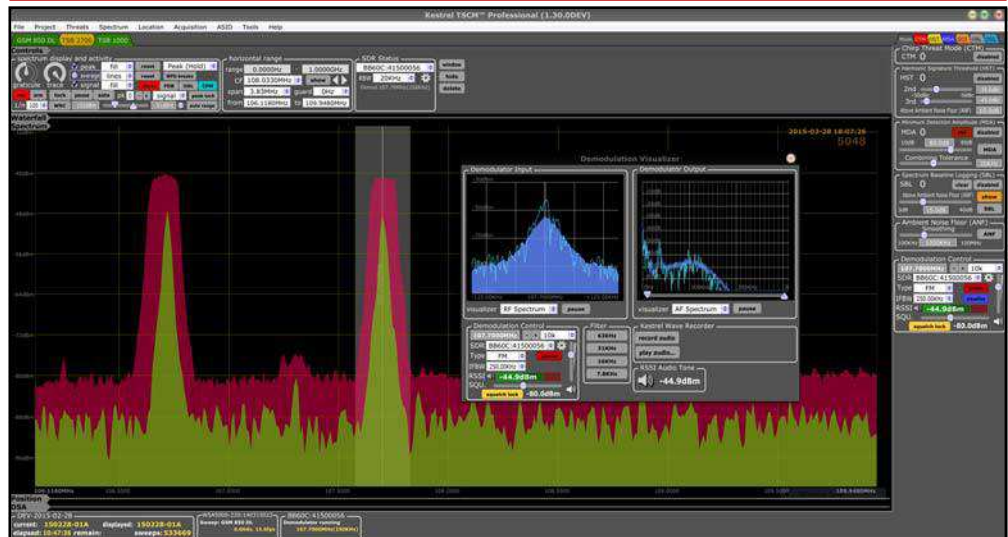


## Frequently Asked Question!

**Q |** How does the dual receiver "hand-off" work?

**A |** Our dynamic receiver "hand-off" capability extends to both the spectrum and demodulation process. It is not limited to dual receiver applications, and supports multiple receivers. For example, it is possible to connect a Signal Hound BB60C, ThinkRF WSA5000, and any other supported receiver, or analyzer, and dynamically "hand-off" the spectrum sweep and demodulation process across any connected device in real-time. Simply select the hand-off receiver, and the process is handled by the software without data loss. ✂

**Agile, Operator Centric, and Work-Flow Oriented!**



**Kestrel TSCM™ Professional Software - Well Positioned to Hunt in a Complex Signal Environment**



## Key Features

### Signal Detection, Identification, and Analysis

The ability of the Kestrel TSCM™ Professional Software to capture, and display near-field Signals of Interest (SOI) allows the technical operator to quickly identify the presence of potentially hostile signal events and immediately proceed to locate the actual source of the emission. Locating and neutralizing hostile emitters is the primary deployment objective. The analysis of any actual intelligence contained within the radiated transmission or stored within the device is generally a secondary consideration. ✂

### Channel Profile Mask (CPM)

The ability to clearly identify official bandwidth specific allocations at the signal and / or band level, promotes exceptional situational awareness, allowing the technical operator to focus on the identification of potentially hostile signal events, and ignore known friendly signals. ✂

### Peak Capture Envelope (PEC)

The ability to capture and display the ambient RF spectrum environment in a peak capture mode over a period of time, allows the operator to not only detect, but clearly identify the presence of Frequency Hopping Spread Spectrum (FHSS) signals, even when these operate near the ambient noise floor. Often, the signal will hop at a rate that is difficult to observe within the Real-Time Event (RTE) trace, but will be easily identifiable using the peak capture mode. ✂

### Out of Band (Hostile) Signals

When the technical operator utilizes the Channel Profile Mask (CPM) capability, the presence of potentially hostile, out of band emitters are easy to identify as operating within the spectrum. Near-field emitters will often exhibit harmonic characteristics. Even when their fundamental frequency lies within a legitimate band allocation, the radiated harmonics will fall outside, thereby providing opportunities to for detecting and identifying signals of interest. The displayed signal event (right side of display) is actually the second harmonic of a fundamental frequency in the UHF band. ✂

### Carrier Current Transmitters (CCT)

The existence of Carrier Current Transmitters (CCT), Broadband Power Line (BPL) emitters, including signals using advanced modulation types such as OFDM, is easily demonstrated using the Kestrel TSCM™ Professional Software. ✂

### Signal Display and Capture

Wi-Fi, Bluetooth, ZigBee, FHSS, DSSS, OFDM, ATSC, NTSC, GSM, CDMA, LTE, FSK, OOK, and many other signals types, can be captured and displayed. ✂

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Real-Time, and  
Post Event  
Analysis, with  
LVA Technology

DECT 6.0 Wireless Microphone

Frequency Hopping Spread Spectrum (FHSS) - 900 MHz ISM Band

Out of Band Emitter (2nd Harmonic) - Audio Tx

Carrier Current Transmitter (200 kHz)

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Kestrel TSCM™ Professional Software - Well Positioned to Hunt in a Complex Signal Environment





## Key Features

### Bluetooth and Wi-Fi Detection

The ability of the Kestrel TSCM™ Professional Software to acquire and display Wi-Fi and Bluetooth signals within the immediate target area enables the technical operator to determine whether a signal originates from within the target area, or from outside, locate the emitter, and verify its origin and purpose. The Kestrel Waterfall Display (WFD) verifies the presence of Wi-Fi and Bluetooth emitters operating within the ambient spectrum environment. The Kestrel Channel Profile Mask (CPM) provides the technical operator with a clear channel occupancy pattern, as illustrated across the entire ISM 2400 MHz band down to the Bluetooth channel level. ✈

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### Kestrel TSCM™ Deployment Methodology

The Kestrel TSCM™ Professional Software addresses a major capability gap by offering a low cost, operator centric and work-flow oriented application. ✈

#### 1 | Deploy

Agile software with extensive applications:

- Traditional operator assisted TSCM;
- Unattended, managed remote Spectrum Surveillance and Monitoring;
- Basic Test & Measurement;
- Educational and Training;
- Spectrum Analysis;
- Testing and Evaluation of surveillance and other RF devices. ✈

#### 2 | Detect and Capture

- Runtime capability of days, weeks, or months;
- Capture spectrum data for real-time and post-event analysis and review;
- Manage long-term storage of spectrum data. ✈

#### 3 | Analyze and Identify

- Live View Analysis (LVA)™ functions in parallel with real-time data collection;
- Runtime and post event analysis, historical file review, with trace import capability;
- Export data for post event analysis, utilizing other resources. ✈

#### 4 | Confirm

- Demodulation capability and visualizer for real-time analysis of signal events. ✈

#### 5 | Locate

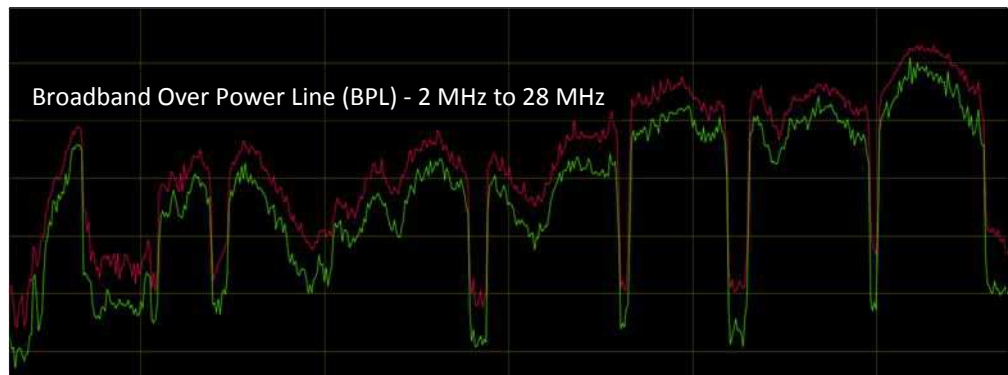
- Emitter localization utilizing RSSI-based techniques. ✈

#### 6 | Neutralize

- Quickly neutralize hostile emitters. ✈

#### 7 | Report

- Generate custom, runtime, or post capture session reports with support for images and floor plans. ✈



## Kestrel TSCM™ Professional Software

### A Trusted Brand Worldwide!



Since 1979, the principals of Professional Development TSCM Group Inc. have provided professional Technical Surveillance Countermeasures (TSCM) services to individuals, private businesses, corporations, crown corporations government agencies, law enforcement, and military organizations worldwide. Our brand and credibility reflect our solid record of achievement:

- Professional Technical Security (TSEC) Services;
- TSS Certification Training Program;
- Development of the TSB 2000 (Technical) Standard™;
- Innovative TSCM software Development. ✈

Kestrel TSCM™ Professional Software comes with excellent technical support, a detailed Software Programming and Operation Manual (SPOM), and our 3-Day resident based Technical Operator Certification Training Program

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Kestrel TSCM™ Professional Software - Well Positioned to Hunt in a Complex Signal Environment