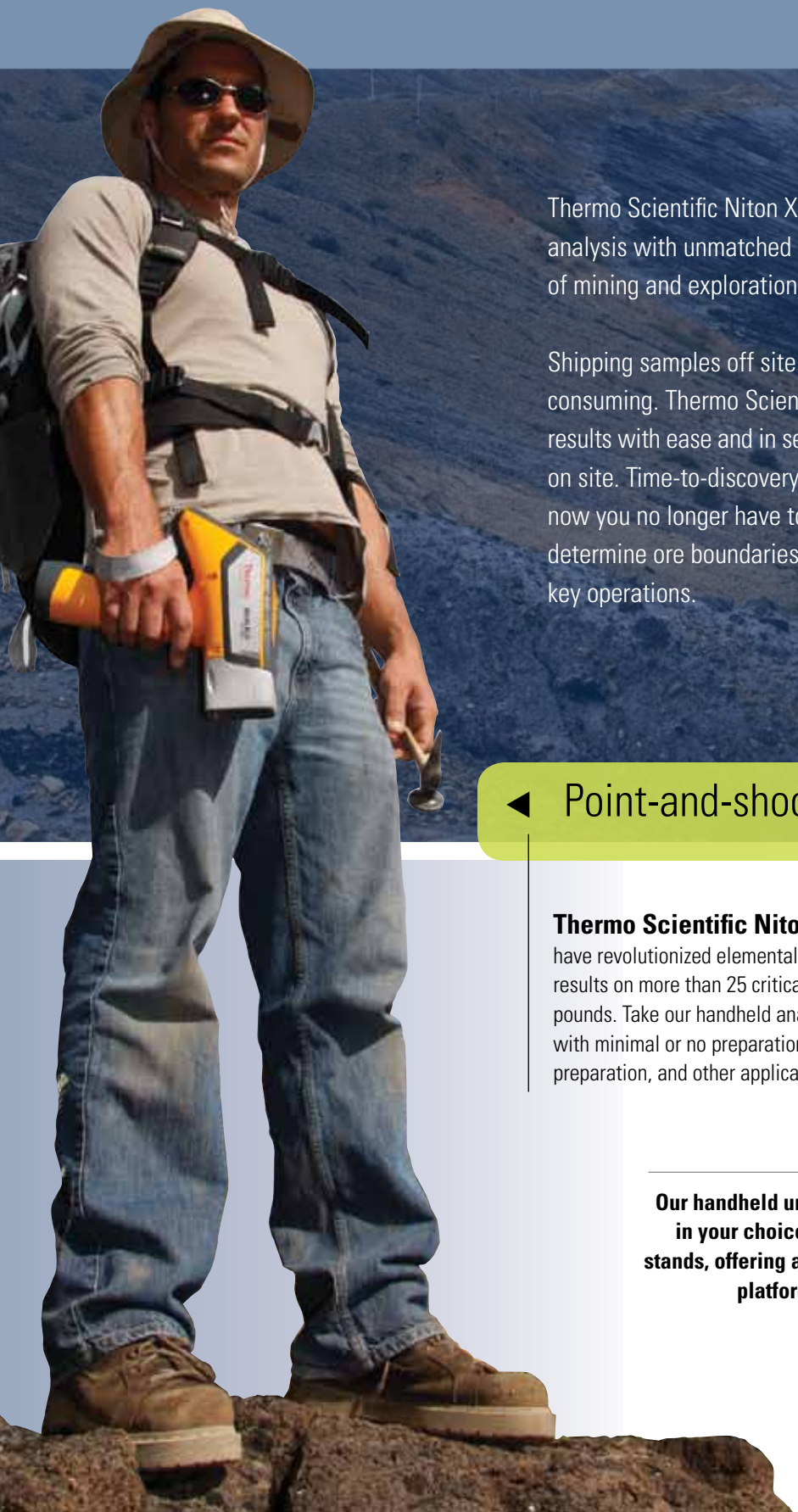
Mining and Exploration

Thermo Scientific Niton XRF Analyzers

Setting the standard in geochemical analysis solutions for mining and exploration

Thermo Scientific Niton XRF Analyzers

Superior geochemical analysis in seconds, right on site



Thermo Scientific Niton XRF analyzers deliver accurate elemental analysis with unmatched efficiency for companies across all stages of mining and exploration.

Shipping samples off site is simply too slow, expensive, and time consuming. Thermo Scientific Niton analyzers provide lab-quality results with ease and in seconds rather than days, virtually anywhere on site. Time-to-discovery is a real competitive advantage, and now you no longer have to wait for the critical data you need to determine ore boundaries, mine mapping, grade control, and other key operations.

Point-and-shoot simplicity

Thermo Scientific Niton handheld XRF analyzers have revolutionized elemental analysis. Just point and click for accurate, instant results on more than 25 critical elements. They're ruggedized and weigh less than three pounds. Take our handheld analyzers anywhere you need many samples tested quickly with minimal or no preparation. They are ideal for site discovery, qualification, site preparation, and other applications.

Our handheld units also operate in your choice of optional test stands, offering a convenient test platform when needed.

Engineered for the way you work.

▲ Take your lab with you

The Thermo Scientific Niton FXL field x-ray lab
couples our proven, pioneering XRF technology with true lab-quality performance.

You can operate the compact unit from the back of a truck, mounted on a tripod, or in your on-site lab. Experience fast, superior elemental analysis with easy touch-screen operation and the full-featured high performance that surpasses even our handheld offerings. The Niton® FXL has an internal battery and is designed without compromise to operate reliably in dusty, harsh field environments. What's more, basic operation requires little training.

It's the perfect complement to our handheld analyzers, providing a total sample testing solution.

Fast. Accurate. Easy to use.

Thermo Scientific Niton XRF analyzers deliver fast performance and low levels of detection for more than 25 elements, including light elements (Mg-S) for instruments with GOLDD technology

HANDHELD

Exceptionally fast, easy to use
Just point and shoot or close the lid (Niton FXL). See results in seconds on a touch-screen color display.

Fit, form, function
Ruggedized with sealed construction, our analyzers are built with tough LEXAN® plastic, and are dust- and water-resistant for worry-free use virtually anywhere. One-step system check requires no external accessories while advanced batteries support extended continuous operation on a single charge. All units operate virtually anywhere on site with a touch of the bright, color LCD screen. No PC is required, alleviating the worry of computer crash and loss of data.

Nondestructive with minimal sample preparation
Unlike destructive testing methods, samples remain intact and undamaged for archiving purposes. All Thermo Scientific Niton analyzers easily accommodate a wide variation of samples, with little or no pre-test preparation required.

TestAll™ Geo Technology
This unique feature automatically determines the correct analytical test mode for rapid analysis of major and minor elements in geological samples (Niton XL3t GOLDD+ and Niton FXL).

Pseudo-elements
This feature allows users to calculate oxide weight percentage and ounce per ton Au equivalents as well as to enter cut-off grade.

Niton XL2
HANDHELD
VALUE LEADER

Niton XL2 GOLDD
HANDHELD
PERFORMANCE
LEADER

Which XRF analyzer is right for you?

HANDHELD THERMO SCIENTIFIC NITON XRF ANALYZERS

- Maximum mobility
- Fastest results
- Point-and-shoot simplicity
- Ideal for mine modeling/mapping, grade control, and element anomaly identification
- Integrated CCD camera; optional 3 mm small spot

Niton XL2 Series	Niton XL2 GOLDD Series
Ruggedized for outdoor environments	Light element analysis (Mg-S) without helium purge or vacuum
Ideal for grade control, plant operations, and near-mine exploration	Higher performance and sensitivity for challenging applications
Exploration for base and ferrous metals (Cu, Pb, Zn, Fe, Ti, V, Cr)	Easily perform trend analysis by averaging readings in real time
Standard analysis range of up to 25 elements	Rapid results for confident decision-making

FIELD X-RAY LAB

Take advantage of additional laboratory features including X-Y positioning for fine adjustment of the XRF beam, 1 mm and 3 mm spot sizes, and included CCD camera for the Niton FXL.

Niton XL3t GOLDD+
SUPERIOR HANDHELD
PERFORMANCE AND FEATURES

Niton FXL
ANALYZER
UNSURPASSED
PERFORMANCE
AND FEATURES

Niton XL3t GOLDD+ Series	Niton FXL
Performance for advanced exploration; highest sensitivity and measurement accuracy	Analysis of raw materials for cement making, bauxite and penalty elements in coal and Fe ore without helium purge or vacuum
Identify elemental anomalies near the earth's surface	Exceptional Mg-U sensitivity; ultimate lab performance in a field-mobile package
Best pathfinder detection limits (Hg, As, Sb, etc.) for Au and PGE	Best light element and trace metal analysis for gas shale and mud logging applications
Ultra-low Mg-S detection available with optional helium purge	Powerful yet portable XRF suitable for use anywhere lab results are required

NITON FXL FIELD X-RAY LAB

- Highest performance and lowest levels of detection
- More traditional lab features
- Smallest spot sampling
- Closed-beam design for meeting emission requirements
- Sample spinner for reducing sample heterogeneity issues due to particle size

Lab-quality analysis in an instant

That's why thousands of Thermo Scientific Niton analyzers are hard at work in the mining industry today, and the number is growing weekly.

Meeting the Exploration Challenge with **Thermo Scientific Geometrically Optimized Large Area Drift Detector (GOLDD) Technology**

Thermo Scientific GOLDD technology delivers faster measurement times and lower detection limits, analyzing elements from magnesium (Mg) to uranium (U) with ease. Whether you choose the performance-leading Niton XL2 GOLDD™, the Niton XL3t GOLDD+, our ultimate choice in features and performance, or our no compromise, lab-quality field-mobile Niton FXL – you'll benefit from enhanced capabilities to identify elemental anomalies near the earth's surface.

They deliver fast, accurate elemental analysis for intensive metals exploration whether base metals, precious metals, or even rare earth elements.

- **Soil/sediments**
- **Drill cuttings and drill core**
- **Outcrop**

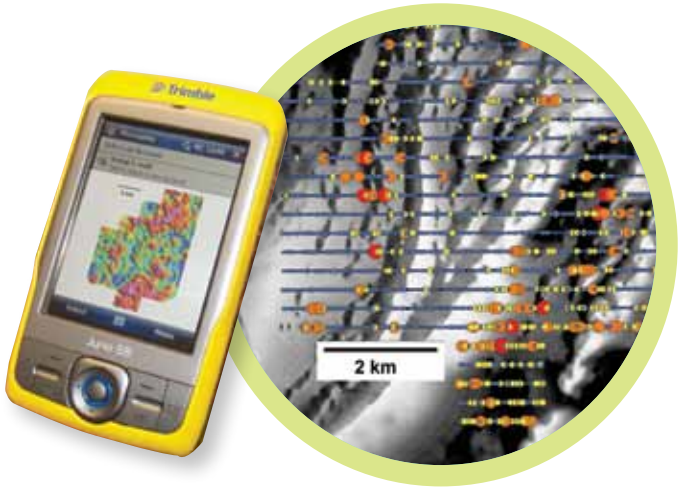
What's more, you will find our analyzers actively in use in oil and gas exploration as well as industrial mineral mining.

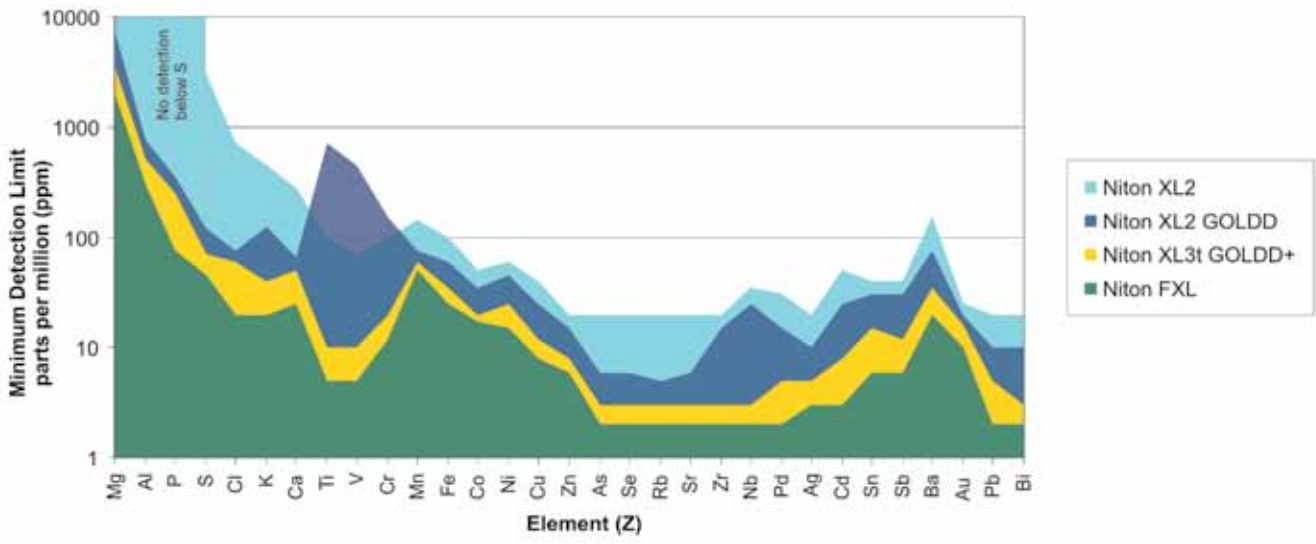
Knowing Your Boundaries with **Portable GIS/GPS Applications**

When it comes to field mapping applications, choose what works for you – our out-of-the-box solution or your existing mapping package.

Our complete exploration package seamlessly integrates with the most popular mobile GIS software on field computers with embedded GPS.

- **Plot geochemical data on maps in real time**
- **Reach infill and step-out decisions instantly**
- **Make more informed decisions while saving significant time and labor costs**





Applications

For mining and exploration, there's a Thermo Scientific Niton analyzer that helps meet your need:

Mining Exploration
Thermo Scientific Niton XRF analyzers excel at providing solid data quickly to delineate ore and waste boundaries, including the quantitative analysis of elemental concentrations that you require for confident decision making during exploration:

- Soil survey and outcrop preliminary exploration
- Advanced exploration and drilling
- Mine modeling/mapping
- Superior performance on heavy elements
- Outstanding Au and pathfinder (Hg, As, Sb, etc.) LODs
- Exceptional light element performance (for contaminants P, Si, Al, Mg)
- Lab-quality assay with basic sample preparation

Mining Production
Fast, laboratory-grade sample analysis made simple: test your samples on site with little or no sample preparation. You get the accuracy you need to provide defensible data for financial transactions, ore trading, and "go/no go" decisions.

- Grade control
- Highest accuracy around cut-off grade
- Ore trading
- Concentrate measurement

Mine Site Analysis
The ability to send and share XRF data to head-quarters allows easy collaboration for informed decisions, just when you need it most. You literally bring the lab to the field, avoiding lab turnaround delays and costs. Lead times are reduced, which can be critical if your exploration season is short.

- General-purpose mine site analyzer for multiple casual users
- Eliminates problematic "one-offs" for the laboratory, which interrupt routine work
- Provides an analytical alternative to busy labs

Mining – Industrial Minerals
Offering superior detection limits and unmatched precision, the Niton FXL XRF analyzer is the instrument of choice for evaluating the composition of raw materials such as gypsum and limestone for industrial mineral use.

- Ideal for determining penalty elements in coal (Fe), Fe ore, bauxite, limestone
- Excellent light element LODs with ultra-low Mg levels for dolomite in limestone
- Ore blending
- Resource estimation

Mining – Oil & Gas Exploration
Niton XRF analyzers are valuable for upstream exploration and production, offering rapid, on-site bulk chemical analysis of rocks that can be used for identifying formations and determining the bulk mineral composition of the rock. They also excel at inferring rock properties favorable to oil and gas production from data collected in a real-time environment – whether at the rig site or remotely via a data connection.

- Advanced exploration and drilling
- Mud logging
- Gas and oil shale – the Niton FXL is ideal for light element and trace metal analysis required for gas shale applications

Customize your testing solutions:

A full line of options and accessories is available to meet your unique testing requirements

Every Thermo Scientific Niton XRF analyzer is engineered to help meet your mining and exploration needs:

Legend: +++ Superior; ++ Excellent; + Good; – Not applicable/not available

Mining Segment	Applications	Niton XL2	Niton XL2 GOLDD	Niton XL3t GOLDD +	Niton FXL
Mining Exploration	Soil survey; outcrop preliminary exploration	++	+++	++	++
	Advanced exploration and drilling	–	+	+++	++
	Mine modeling/mapping	+++	+++	+++	+++
	Performance on heavy elements	++	++	+++	+++
	Au and Au pathfinder (Hg, As, Sb, etc.) LODs	+	++	+++	+++
	Lab-quality assay with basic sample preparation	+	+	+++	+++
	Light element performance (for contaminants P, Si, Al, Mg)	–	+	+++	+++
Mining Production	Grade control	+++	+++	+++	+++
	Highest accuracy around cut-off grade	++	++	+++	+++
	Ore trading	++	++	++	+++
	Concentrate measurement	+++	+++	+++	+++
	Ore blending	+	++	++	+++
Mine Site Analysis	General-purpose mine site analyzer	++	+++	+++	+++
	Reduces workload on lab	+++	+++	+++	+++
	Eliminates “one-offs” for the lab	++	++	+++	+++
Mining – Industrial Minerals	Determines penalty elements in coal (Fe), Fe ore, bauxite, limestone	–	+	++	+++
	Light element LODs with the low Mg levels for dolomite in limestone	–	+	++	+++
	Resource estimation	+	+	+	+++
Mining – Oil & Gas Exploration	Advanced exploration and drilling	–	+	+++	+++
	Mud logging	–	+	+++	+++
	Gas and oil shale – light element and trace metal analysis required for gas shale applications	–	+	++	+++
	Powerful/portable XRF suitable for trailer use	–	–	–	+++
	Light element LODs; shorter measurement time	–	+	++	+++
	Direct measurement of cores and cuttings in-situ without additional sample prep	+	+	+++	–

Extend-a-Pole™ *– telescoping extension pole with analyzer cradle offers remote trigger activation; also features folding bi-pod supports to facilitate in-situ testing while standing upright.*

Tripod *– Optional tripod for the Niton FXL allows easy set up and operation anywhere.*

Portable test stands *– multiple options are available; some are collapsible for easy transport and provide a safe platform for analysis of small or irregularly shaped samples, plus bagged and cupped samples. Onboard RFID technology automatically adjusts the analyzer's parameters for test stand use.*

Field Mate *– This fully-shielded test stand is ideal for field analysis of 32 mm sample cups and small bagged samples; also features a metal snap-on plate for hands-free use and RFID for analyzer recognition.*

"At Madero Project, the [Thermo Scientific] Niton [analyzer] has allowed us to take assay analyses in real time, and make appropriate decisions in our operations in real time, with tremendous savings."

Randolfo Lopez, chief geologist, Madero Project, Peñoles

"…the major benefit [of our Thermo Scientific Niton analyzer] has come from making confident decisions…it allows us to now go to a face and observe, and back up those observations with base metal value measurements, which…give us an accurate representation of where the cut off of the value zone is...Furthermore, there is an enormous and almost unquantifiable benefit in the sense that the mine was laid out on a three-day turnaround [to obtain lab results] and the subsequent confirmation of the mining cut. Now this is done within the same shift; the net effect is huge in terms of the mine layout and capital footprint."

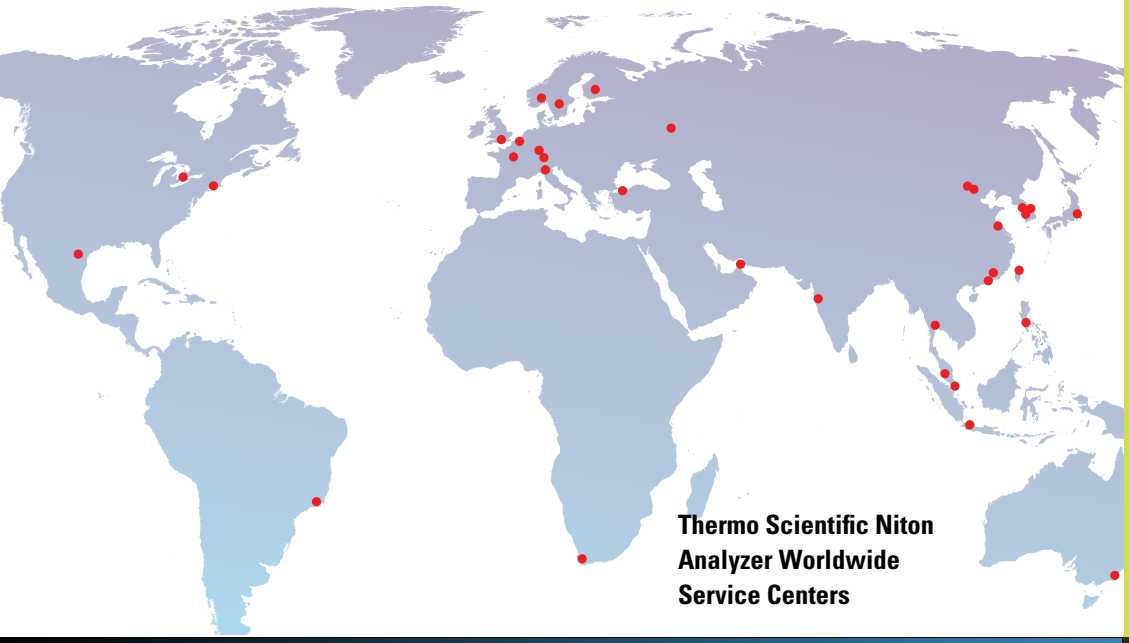
Gordon Chunnett, head of geology, Anglo Platium

"Knowledge is the key, and [Thermo Scientific] Niton XRF gives us on-the-spot knowledge. This facilitates decision-making, resulting in time and cost savings."

Andrew Gillies, managing director, Metallica Minerals Limited

Delivering critical results to leading mining companies around the world.

- Anglo American
- African Consolidated Resources
- Barrick Gold
- Bell Copper
- CODELCO Exploraciones
- Colorado Goldfields
- Vale
- Rio Tinto Mining & Exploration
- Store Norske Gull



Thermo Scientific Niton Analyzer Worldwide Service Centers

Superior XRF analysis solutions, backed by our worldwide sales and service

We are recognized as the leader in XRF analysis technology, serving companies in more than 75 countries on six continents. We serve our customers through corporate resources and a dedicated network of more than 70 distributors and 30 factory-trained service centers around the world to provide the most effective customer service possible. Our global reach and resources not only ensure worry-free product support, we also offer comprehensive services including application consulting and training anywhere you need them.

XRF Analyzers

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