Si-Ware™ Systems

Si-Ware Systems MIR Innovation Kits Portfolio

Explore Miniaturized MIR Spectral Sensing, From Early Feasibility to Field Experimentation

For a World That Makes More Sense

Proven Leadership in Miniaturized Spectral Sensing Technology

20+	130+	15,000+
years of innovations	patents	sensors delivered

MINIATURIZED MIR

NOW ACCESSIBLE FOR REAL-WORLD, PLUG & PLAY EXPERIMENTATION

Mid-infrared sensing unlocks strong molecular absorption features that help distinguish materials and gases with high accuracy. However, reaching a miniaturized, field-testable MIR stage typically takes years from optics, to packaging, firmware, connectivity, and software workflows.

As pioneers in MEMS-based miniaturization, introducing the world's smallest FT-IR sensors, Si-Ware delivers that full stack through Innovation Kits, saving you at least 5 years of development time which allows you to start experimenting right away, and beyond the lab.

Innovation Kits = Practical Gateways to Test MIR Possibilities

Our Innovation Kits are compact, plug-and-play MIR experimentation platforms, designed to help teams explore miniaturized MIR sensing, validate application potential, and define requirements for future products & systems across various applications.

Explore various materials, including gases, using MIR sensing with flexible optical setups

Validate feasibility quickly using real spectral data and controlled experimentation

Define requirements for future MIR products and solutions in your application

Choose the Right MIR Kit for Your Application

Si-MIR
Core

Ultra compact MIR testing platform

1.4 - 4.7 µm

Compact, modular MIR setup for quick feasibility studies across different materials.

Best for

Teams exploring miniaturized MIR in environments where size & power use matter.

- **Start fast with a stable, modular setup**
- **Portable kit with low-power usage**
- **Ultra compact sensor module**

Si-MIR
WideRange

Fingerprint coverage platform

2 - 10 µm

Broad-range MIR exploration platform reaching the fingerprint region for diverse materials.

Best for

Application discovery that needs 2–10 µm coverage across gases, liquids, and solids.

- **Access the fingerprint region for richer identification**
- **Flexible optical experimentation**
- **Improved precision with SNR target ~5,000:1**

Si-MIR
AirTrace

Open-air gas experimentation

1.4 - 4.7 µm

Field-focused MIR platform for low-concentration gas sensing in ambient/open air.

Best for

Teams testing the potential of MIR spectroscopy for multi-gas detection and analysis in open-air.

- **Detects multiple gases simultaneously**
- **Offers clear advantages over typical gas sensors, upgradable with no consumables**
- **Build for field-operations with various mounting options**

Explore Si-Ware Systems MIR Portfolio

Built to Experiment From Day One

- Plug-and-play experimentation platforms
- Real spectral data collection with desktop software
- Flexible setups to test feasibility early
- A clearer path to requirements and next-step system design

Si-MIR Product Line

Si-MIR

Core

Innovation Kit

Compact MIR sensor enabling accurate transmission-based analysis

Si-MIR Core is a compact MIR sensing setup designed for researchers and developers exploring Si-Ware's miniaturized FT-IR technology across different materials.

Its compact, modular design and low power consumption make it suitable for experiments that demonstrate the use of MIR spectral sensing in environments where traditional MIR spectrometers are impractical.

It provides a stable and flexible setup to study MIR spectral behavior, assess feasibility on specific samples, and support early system design decisions. This makes it an accessible starting point for teams evaluating how miniature MIR sensing could enable new applications or product concepts.

Key Features & Advantages

- Compact design with low power consumption
- Designed to enable flexible experimentation setups
- Plug & play and easy-to-use

Measurement mode	Sampling method	Sample Types
Discrete	Transmission	Thin Solids, Liquids

Key Specs	Unit
Spectral Range	7,000–2,130 cm^{-1} (1.4 - 4.7 µm)
SNR	1,700:1
Resolution	42 or 66 cm^{-1}
Photodetector	PbSe
Connectivity	USB-C
Dimensions	**Light source**: W 40.8 × L 30 × H 24 mm^3 **Spectrometer module**: W 85 × L 60 × H 46.6 mm^3
Weight	**Light source**: 20 g **Spectrometer module**: 210 g
Software	Si-Spect

Optical interface

Separate light source and spectral sensing modules

Si-MIR

WideRange

Multi-purpose MIR spectral sensing platform covering key fingerprint regions

Innovation Kit

Si-MIR WideRange is a mid-infrared sensing setup designed for researchers and developers exploring Si-Ware's miniaturized FT-IR technology in applications that require a broad spectral range, reaching the fingerprint region.

It covers the full 2–10 µm range and features a flexible source and detector layout that supports optical experimentation across gases, liquids, and solids.

Its modular design, stable operation, and ultra-wide spectral range make it suitable for assessing feasibility on diverse materials and for defining requirements for new material sensing applications and solutions.

Key Features & Advantages

- Wide spectral range
- Designed to enable flexible experimentation setups
- Plug & play and easy-to-use

Measurement mode	Sampling method	Sample Types
Discrete	Transmission	Thin Solids, Gases, Liquids

Key Specs	Unit
Spectral Range	5,000–1,000 cm^{-1} (2 - 10 µm)
SNR	5,000:1
Resolution	42 or 66 cm^{-1}
Photodetector	Cooled InAsSb
Connectivity	USB-mini
Dimensions	**Light source**: W 116 × L 118 × H 115 mm^3 **Spectrometer module**: W 116 × L 118 × H 115 mm^3
Weight	**Light source**: 380 g **Spectrometer module**: 980 g
Software	SpetroMOST

Optical interface

Separate light source and spectral sensing modules

Innovation Kit

Si-MIR

AirTrace

MIR platform for detecting low-concentration gases in open air

Si-MIR AirTrace is a mid-infrared spectral sensing device designed for field experimentation of Si-Ware's miniaturized FT-IR technology for analyzing low-concentration gases in ambient or open-air environments.

Its architecture provides access to critical absorption bands in the MIR fundamental region, allowing researchers and developers to observe several gases simultaneously and investigate how unknown species can be identified without hardware changes.

Calibration models can be updated to refine or expand gas targets, making Si-MIR AirTrace a practical tool for feasibility studies and for defining requirements for future gas-sensing systems.

Key Features & Advantages

- Analysis of gases in open air without controling gas flow
- Analysis and detection of low concentration gases (sub ppm levels)
- Simultaneous analysis of multiple gases
- No replaceable consumables or detection materials
- Ability to upgrade functionalities without changing hardware

Measurement mode	Sampling method	Sample Types
Continuous	Transmission	**Gases** Hydrocarbons, alcohol vapors, VOCs, CO_2, CH_4, hazardous and industrial gases, breath

Key Specs	Unit
Spectral Range	7,000–2,130 cm⁻¹ (1.4 - 4.7 µm)
SNR	>1,700:1
Resolution	66 cm⁻¹
Photodetector	PbSe
Connectivity	Ethernet
Dimensions	W 293 × L 155 × H 164 mm³
Weight	1.6 kg
Software	Si-Spect

Optical interface

Built-in light source and an open gas cell with reflector for effective optical path length of 4.8 m

Integration Environments

Steady machines, drones, moving vehicles

Accelerate Evaluation and Model Development with Si-Spect Software

The unified desktop software for all Si-Ware products

- Control sensors and analyzers
- Manage datasets and compare measurements
- Collect and visualize spectra
- Use spectral data to build & train models

Application Specific Model Building

Si-Spect can now help you build, train and update your own models from the software itself without the need to build them outside and integrate them back.

Transforming bulky lab instruments into compact MIR Platforms

Integrating Advanced photonics and MEMS to make portable MIR spectroscopy a reality

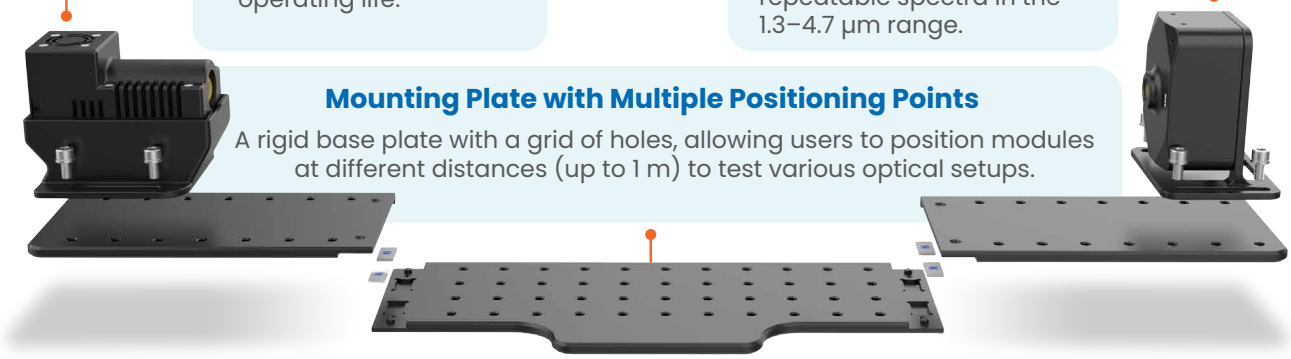
Si-MIR Core

Infrared Light Source Module

Compact, efficient MIR light source optimized for stability and long operating life.

MIR Spectrometer Module

Compact MEMS-based FT-IR spectrometer featuring a low-noise photodetector for repeatable spectra in the 1.3–4.7 µm range.



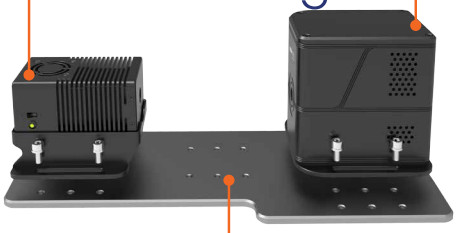
Mounting Plate with Multiple Positioning Points

A rigid base plate with a grid of holes, allowing users to position modules at different distances (up to 1 m) to test various optical setups.

Si-MIR WideRange

Infrared Light Source Module

A powerful and efficient light source optimized for wide MIR coverage and consistent illumination.



MIR Spectral Sensing Module

A compact FT-IR spectrometer powered by Si-Ware's proprietary MEMS-based Michelson interferometer and cooled InAsSb detector.

Mounting Plate with Multiple Positioning Points

A sturdy base plate with a grid of holes, allowing distance adjustment between the light source and the sensing module (up to 20 cm) for flexible optical configurations with minimum alignment effort, as well as the mounting of various accessories.

Si-MIR AirTrace

Open Gas Cell + Reflector Path

An open-path gas cell architecture with reflector design delivering an effective optical path length of 4.8 m, enabling analysis of ambient air gases without controlled flow systems.

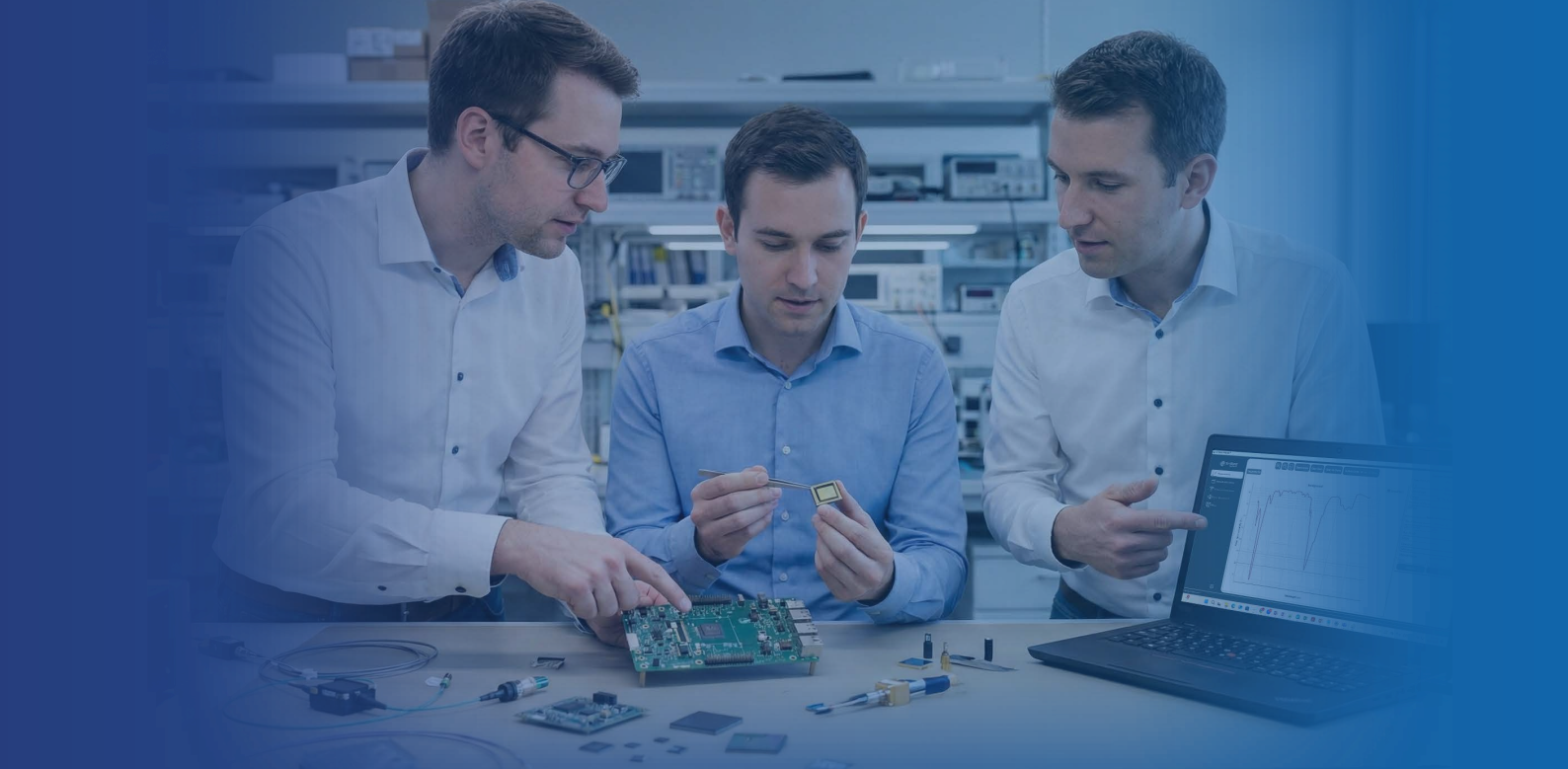
Built-In Light Source

Integrated illumination optimized for the MIR range, supporting stable measurements without external source alignment or additional optical hardware.

Built-in screw holes for mounting AirTrace on a stable platform

Integrated MIR Sensing Engine

A compact MEMS-based FT-IR spectral sensing module with integrated photodetector designed for MIR gas analysis



From First Experiment to Co-Developed MIR Products

Whether you're exploring miniaturized FT-IR for research or validating a path to productization, we can support your journey, helping you evaluate performance, define requirements, and translate learnings into reliable miniaturized MIR sensing solutions.

- Application discovery & feasibility guidance
- Experiment setup support + best practices
- Requirement definition for product development
- Model strategy and expansion planning
- Co-development pathways toward OEM-grade solutions
- Software and model building support

Let's Build What's Next Together

Power your next breakthrough with Si-Ware Systems' Spectral Sensing.

Si-Ware™ Systems

For a World That Makes More Sense

Visit our website

to learn more about our technology stack & explore what's possible

Request a FREE consultation

about feasibility of your solution with our experts

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