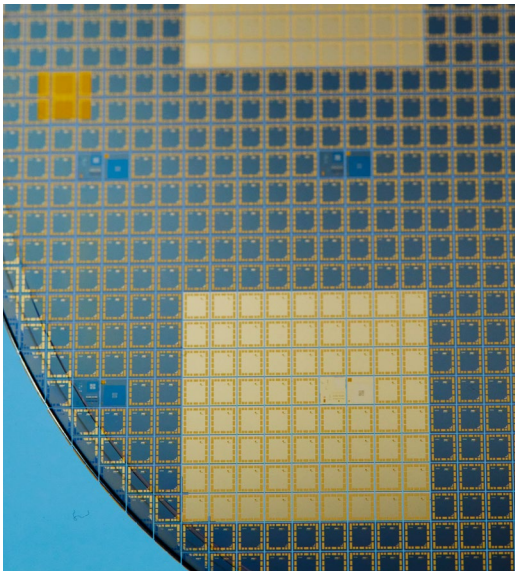
Sensors Unlimited Foundry Services

Raytheon
An RTX Business

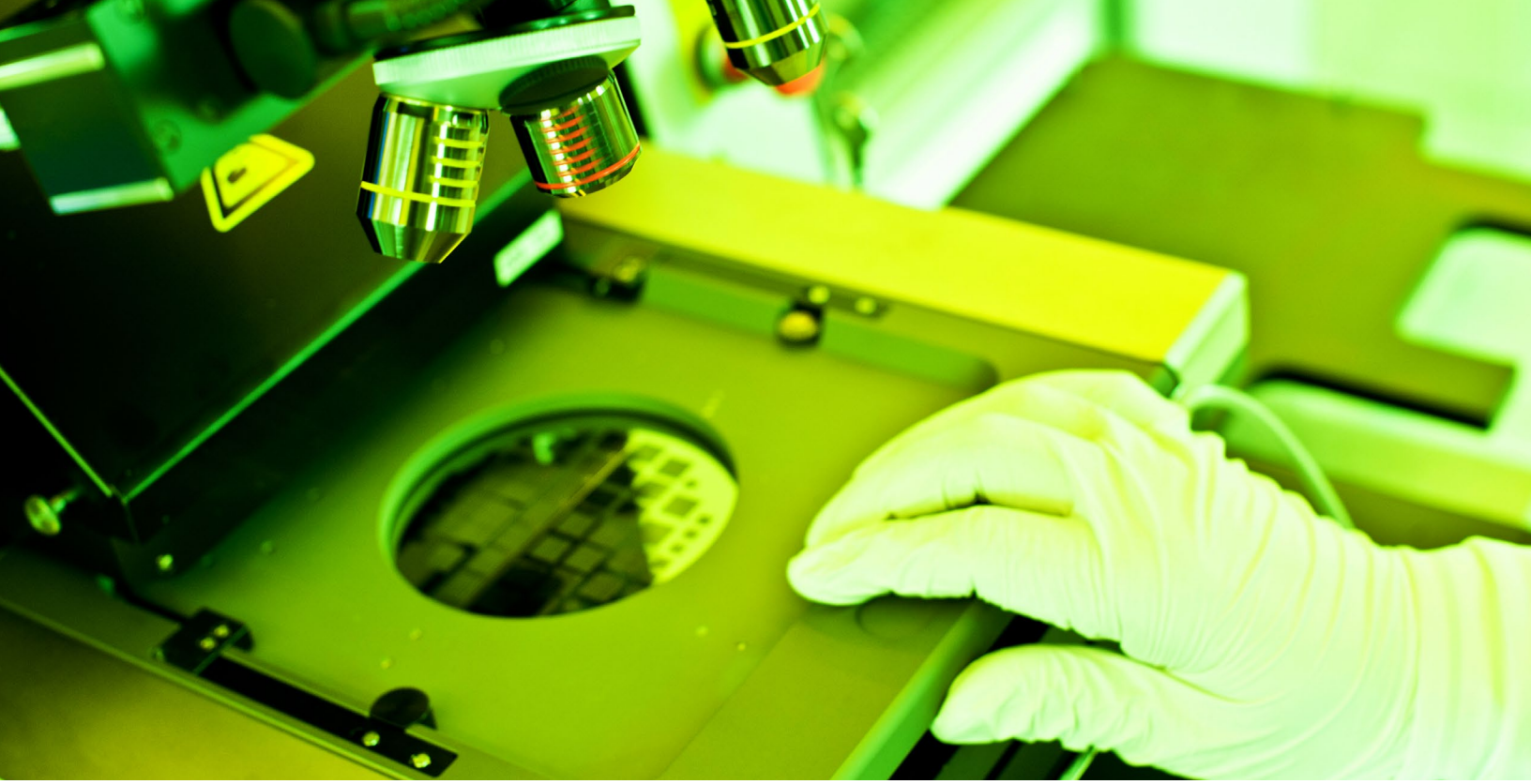
Sensors Unlimited, Inc. (SUI), a Raytheon company, offers III-V foundry services for customized and standard infrared technology, from wafer processing and silicon integrated circuit hybridization to testing and device packaging. A U.S. DOD Trusted Foundry, SUI provides commercial and military customers with domestic manufacturing and test capabilities backed by our more than 30-year history of industry performance.

Located in Princeton, New Jersey, SUI's facility features 5,000 sq. ft. of cleanroom space, including Class 1000 space for most wafer processing and Class 100 space for your most critical steps. The 2,000 sq. ft. Class 10,000 packaging lab ensures that cleanliness is maintained throughout device production. SUI is ISO 9001 certified and routinely handles ITAR-controlled and other sensitive technology.



Wafer fab

Access to SUI's full suite of wafer fabrication processes gives our customers a proven path to high-performance infrared devices for terrestrial and space applications without the necessity of maintaining their own manufacturing lines. SUI can handle 50 mm, 75 mm and 100 mm diameter III-V wafers (InGaAs/InP, InSb), and offers indium bumping on silicon wafers of up to 200 mm in diameter. Customers can select any or all of our available wafer processes.



Wafer processes

Photolithography

Projection lithography and contact lithography tools are available, and SUI will work with you to design and procure photomasks compatible with our process and your device requirements. Multiple photoresist options allow lithography over various wafer topographies and feature sizes.

Wet etch

We provide chemistries for selective III-V semiconductor etching, etchants for dielectric layers, and light etchants for cleaning and surface preparation.

Plasma (dry) etch

Reactive Ion Etching (RIE) with a variety of etch species is available, as are plasma cleaning and plasma resist stripping tools.

Thin film deposition

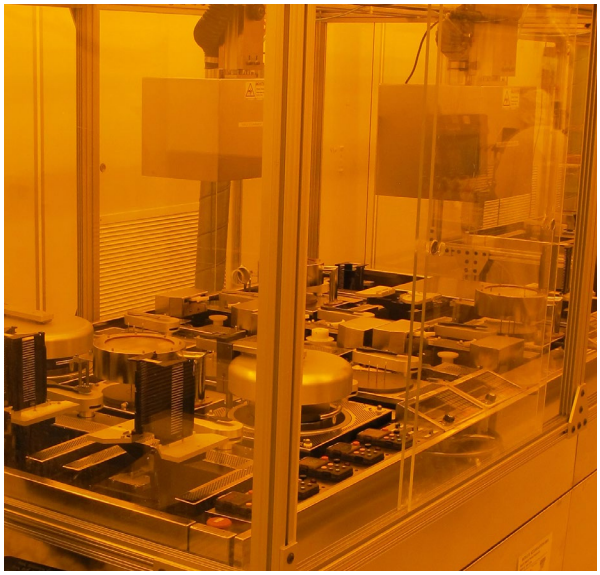
Plasma-enhanced chemical vapor deposition (PECVD) and e-beam evaporation tools are available for deposition of thin film oxide and nitride dielectric layers for use as electrical insulators, etch masks and antireflective coatings.

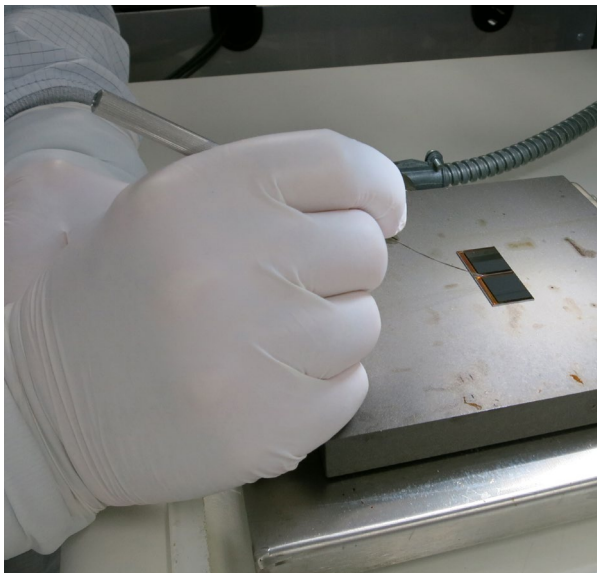
Metallization

SUI employs thermal and e-beam evaporation for metal deposition. Multiple target metals are offered, and our photoresist processing facilitates metal lift-off. Rapid thermal annealing is available for metal-to-semiconductor contact optimization.

Lap and polish

SUI offers wafer thinning, substrate removal and surface polishing using multiple jigs and abrasives. Wafer mounting and dismounting are performed on-site.





Metrology

Our processes are monitored and validated by an extensive array of measurement and characterization methods:

- Optical microscopy (including 3D)
- Scanning electron microscopy (SEM)
- Electron-dispersive x-ray spectroscopy (EDS/EDAX)
- Fourier-transform infrared spectroscopy (FTIR)
- Profilometry
- Ellipsometry
- Wafer bow measurement (laser interferometry)
- Contact angle goniometry
- Coordinate measurement machine (CMM)
- Thin film spectrometry
- Surface defect measurement
- Hall effect measurement
- Doping profile measurement
- X-ray diffraction
- Photoluminescence

Indium bumping

SUI offers evaporative indium bumping for interconnection between your III-V photodiode arrays and silicon readout integrated circuits (ROICs). Bump morphology can be customized for your device format and pixel pitch.

Device singulation

Die singulation can be accomplished by scribe-and-break or by wafer sawing.

Epitaxy and reactor diffusion (coming soon)

SUI's Metal-Organic Chemical Vapor Deposition (MOCVD) reactors enable our customers to produce custom III-V epilayers and to diffuse dopant species for diode formation.

Hybridization

SUI offers flip-chip indium bump bonding of III-V photodiode arrays to silicon ROICs. Die sizes of up to 4" x 4" can be accommodated, as can pixel pitches as small as 5 µm. Hybridized devices are stabilized with our epoxy wicking process and can be safely shipped as-is or receive further assembly in our packaging lab.

Packaging

Services, including device placement, window attachment, wirebonding, hermetic sealing, and leak checking, are offered in SUI's onsite packaging lab, whether your devices are compatible with an existing SUI package or require a custom design.

Electrical testing

We provide wafer-level and device-level electrical characterization data for every job we process. Our in-house mask design capability allows our standard test structures to be supplemented with customized and customer-provided structures, if desired. Autoprobe and manual testing over a wide operational temperature range are available.

Electrical-optical testing

For our imager customers, SUI offers electro-optical (EO) characterization. EO performance metrics, including quantum efficiency, Noise-Equivalent Irradiance (NEI), operability, linearity, and response nonuniformity, can be evaluated in our focal plane test labs. Image correction parameters can be generated over your operating temperature range in our environmental chambers.

Environmental and reliability testing

Onsite thermal, vibration and humidity testing are available from SUI's reliability lab. Our complement of environmental chambers allows our customers to validate the reliability of their designs straight out of the manufacturing line.

Data packages and file transfer

SUI provides in-process and final test data to ensure your satisfaction with our foundry services. All characterization data, photomask designs and other files can be transferred electronically using our secure file transfer server.

Sensors Unlimited products

Sensors Unlimited offers a complete line of products for image sensing in the short wave infrared (SWIR) portion of the light spectrum, producing arrays and cameras that enable users to "see beyond" what the naked eye can detect.

2D SWIR area cameras

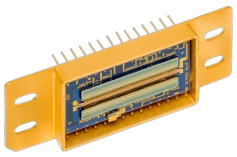
Compact, high-resolution, high-sensitivity SWIR digital video cameras for covert surveillance.

2D SWIR handheld systems

Target accuracy with enhanced situational awareness.

1D SWIR linescan cameras

High-speed InGaAs cameras for use in high-resolution imaging.



1D SWIR linear photodiode arrays

Easy-to-use analog and digital high-speed arrays from 1.45-2.6µm wavelengths.

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