



DUPONT

SILICON VALLEY TECHNOLOGY CENTER



ABOUT US

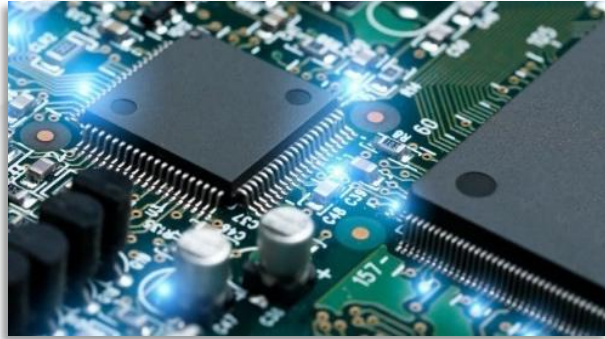
- DuPont's West Coast **Innovation Center & Materials Application Labs** located in Sunnyvale, CA
- Focused on **customer collaboration, education** and **rapid prototyping**
- On-site expertise as **Solutions Providers** in the world of technology



SILICON VALLEY TECHNOLOGY CENTER



OUR PRODUCT PORTFOLIO



ELECTRONICS & IMAGING

World's largest supplier with the broadest set of materials and technologies to solve complex problems for the semiconductor, circuit board, photovoltaic, display and printing industries.

Product Examples

Kapton®, Cyrel®, Tedlar®, IKONIC™



TRANSPORTATION & ADVANCED POLYMERS

Industry leader providing high-performance engineering resins, adhesives, lubricants and parts to engineers and designers in the transportation, electronics and medical markets.

Product Examples

Zytel®, Hytrel®, Kalrez®, Molykote®, Betaseal®, Vespel®



SAFETY & CONSTRUCTION

Global leader in branded products including fibers & foams, aramid papers, non-wovens, solid surfaces, membranes and protective garments serving the worker safety, construction, oil & gas, energy, & transportation markets.

Product Examples

Tyvek®, Kevlar®, Nomex®, Corian®, Styrofoam®, Great Stuff®



SILICON VALLEY TECHNOLOGY CENTER

HISTORY



2011

- DuPont acquires Innovalight, a start-up focused on and high efficiency solar cell technology development enabled by Silicon Ink



2018

- Transitioned from solar to Application Engineering & prototyping for Silicon Valley companies
- April 2018 - Relocated to 965 W. Maude. Opened Fabrication, Quality, and Reliability Labs
- September 2018 – Opened the Innovation Center



2019

- Over 1,000 visitors from 450+ companies
- April 2019 - Opened RF Lab for High Speed/ High Frequency materials characterization
- August 2019 – Start Construction of 3 new labs, including a Class 100 Cleanroom, Workshop, and Collaboration Area



2020

- Ongoing electronic materials application engineering and collaboration with OEM's and Fabricators.
- Start of Lab Expansion & Innovation Center



2021

- Procurement and expansion of 969 W Maude Ave
- Completion of Lab Expansion, installation of new equipment and Innovation Center.





APPLICATIONS LABS

MATERIALS – INTEGRATION – IDEATION

- **Multi-disciplinary** scientists and engineers with the tools to make amazing happen.
- Broad **Rapid Prototyping** capabilities
- **Failure Analysis** with **Solid Solutions**
- 10 labs dedicated to **characterization, reliability, formulation RF Technologies**, and **fabrication** with the flexibility to add more equipment and capabilities as needed
- Highly skilled, rotating selection of technical engineers available for rapid prototyping
- On-site expertise and equipment suited for quick turnaround times on prototypes and proof of concepts.

SVTC APPLICATION LABS CAPABILITY

Prototyping & Fabrication

Lamination: (5G, display, flex)

- OEM High Temp 50 Ton Vacuum Laminator (825F) 2020
- 46 Ton Quick Vacuum Laminator (Coverlay)
- Hot Roll laminator
- Low temperature laminator x2

Coater: (display)

- Slot die coater
- BYK auto drawdown table coater

Flex Patterning & cutting/drilling: (5G, display, flex)

- Laser Drill (UV 355nm, ESI 5335)
- Laser UV for Cu Patterning (LPKF ProtoLaser)
- Laser cutter

Die cutter (works for Kapton®)

Patterning/Printing: (general)

- Screen printer x3 (2 with CCD capability)
- Inkjet printer x2
- Dispenser x2

Curing & Drying: (display, flex)

- Box oven x3
- IR tunnel oven
- UV cure x2 (6" & 23" belt width)
- Autoclave
- High temp furnace

Failure Analysis (5G, flex):

- Precision saw
- Grinding & polishing system

Surface Treatment: (general)

- Plasma chamber
- Corona treater (3DT)
- Forming: (general)
- Thermoforming
- 3D printer

ISO 5 Class 100 Clean Room (2020)

- 500 total sq. ft., 400 sq. ft. working area
- Defect-free slot die coating
- Cleanroom oven
- UV curing

Mixing/ Dispersion: (general)

- Thinky mixer x2
- Ball mill
- Three-Roll Mill

Fabrication Lab (#2)

- Haas compact CNC mill
- 3D printer, large format x2

Characterization

Mechanical & Thermal Properties:

- DSC, TGA with Mass Spec
- DMA
- TMA
- Instron w/ German wheel
- IR thermal camera (close-up)
- Pencil hardness scratch tester

Electrical Properties:

- Contact resistance TLM system/software
- 4-Probe electrical testing x2 (4-probe)

Thermal Management:

- HyperFlash thermal conductivity meter

Rheology:

- Rheometer (AR-G2 parallel plate)
- Viscometers (Brookfield) x4
- Capillary rheometer

Optical Properties:

- UV-Vis Lab (trans%, color index, reflectance)
- Optical Retardation Rth (Axometer)
- Haze meter
- Refraction Index meter

Imaging & Surface Analysis:

- 3D scanning optical microscopy
- SEM
- Surface profilometer
- Contact angle analyzer
- 6,000x Digital Microscope

RF Lab:

- VNA 900Hz-125GHz (insertion loss & Dk/Df)
- VNA 50GHz (insertion loss & Dk/Df)
- Impedance Analyzer (20Hz-10MHz)
- ESPEC environmental test chamber
- POLAR Impedance Tester

Chemical:

- FTIR

Flexibility/Bendability:

- Jovil benders x2
- Yuasa bender x2
- MIT Tester

Reliability:

- Q Sun climate chamber
- MOCON WVTR
- Environmental chamber x2 (Damp heat, HAST)
- Environmental (QUV, Xeon light source)

Out-sourced Capabilities (in Silicon Valley)

Fabrication:

- Copper Etching
- Metallization
- Circuit Patterning
- Flex Circuit Fabrication
- Patterning/Assembly

Metrology

- AFM
- X-ray
- SEM/EDX
- FIB
- Surface Analysis (ESCA)
- UV/Vis/NIR
- Spectral Ellipsometry
- Scratch resistance

Capabilities built based on:

- *External customer requests*
- *Internal business requests and plans*

To enable **rapid prototyping** and **rapid data response**.



SVTC FLEX CIRCUIT CAPABILITY



SVTC Flex Circuit Capability

Flex patterning & cutting/drilling:

- Laser Drill (UV 355nm, ESI 5335)
- Laser UV for Cu Patterning (LPKF ProtoLaser)

Flexibility/bendability:

- Jovil benders x2
- Yuasa bender x2
- MIT Tester

Lamination: (5G, display, flex)

- OEM High Temp Laminator (825F)
- Quick Coverlay Laminator

Failure analysis :

- Precision saw
- Potting, Grinding, & polishing system

Printed Electronics

- Screen printer x3 (2 with CCD capability)
- Inkjet printer x2
- Syringe Dispenser

Electrical properties:

- Contact resistance TLM system/software
- 4-Probe electrical testing x2 (4-probe)

Surface Treatment:

- Plasma chamber
- Corona treater (3DT Polydyne Pro)

Imaging & surface analysis:

- 3D scanning optical microscopy
- SEM
- Surface profilometer
- Contact angle analyzer
- 6,000x Digital Microscope

RF Materials Characterization Lab

- *Next Slide*



DUPONT SILICON VALLEY

INNOVATION CENTER

- Evolving interactive showcase of DuPont's 200+ years of *Materials Innovations*
- Where **OEMs, Designers, and Fabricators** collaborate with DuPont in Silicon Valley
- Interface with DuPont **Application Engineers & Business Development**
- Hub for **virtual & live events, workshops** and **digital experimentation**. Evolving interactive showcase of DuPont's 200+ years of *Materials Innovations*

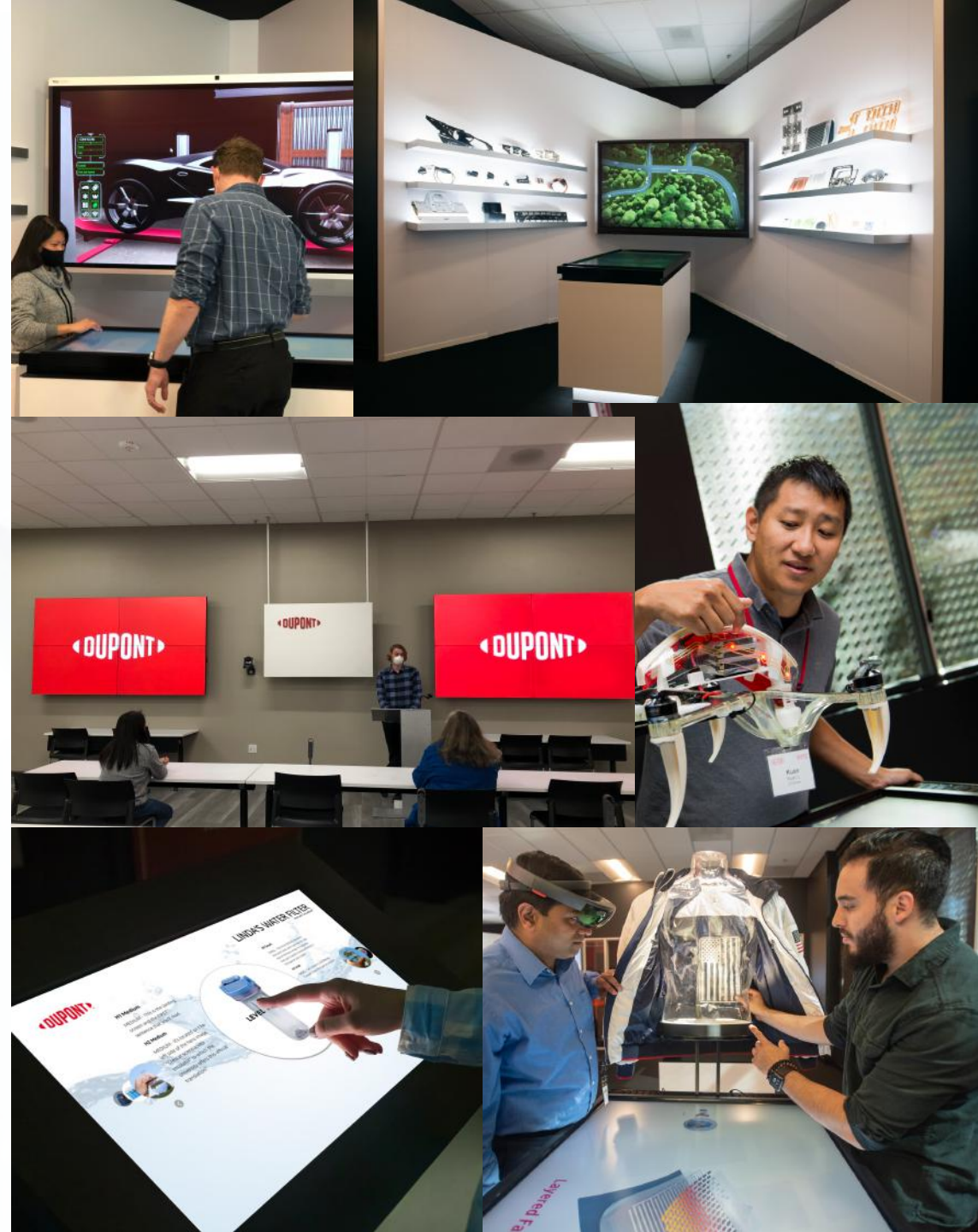


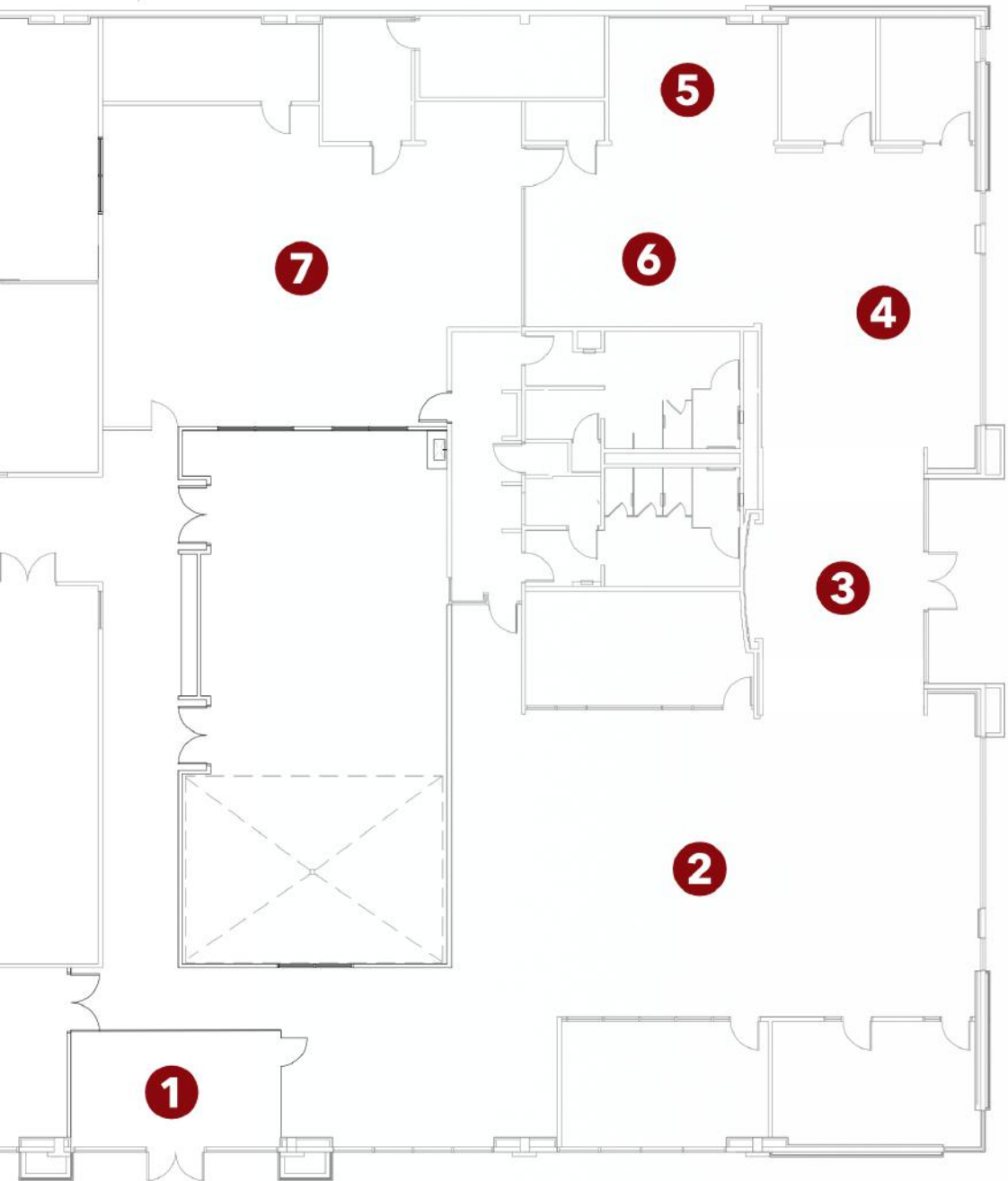
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CENTER EXPERIENCE

- **9 Pedestals touch based** Powered by Intuiface focused on:
 - Drone
 - Sustainability
 - AR Goggles
 - Intexar
 - Metalization
 - Smartphone Teardown
- Award winning AHEAD RFID Experience
- State of the art presentation and meeting center
- Virtual seminars and event production capabilities
- Upcoming lobby, community center, workshop/garage, and prototypes in development





1

Lobby

Visitors enter through the lobby where they are greeted by a beautiful and inviting space. Visitors will check into the site through an intuitive login system. they will then wait for their host while being presented the videos of DuPont and our latest initiatives.

2

Community Area

Once visitors have met with their host they will be guided to the open community area. This will be their first view of the SVTC. The space will be lively with associates utilizing the area to have work and congregate. Visitors will be able to settle down and put away their belongings (to be discussed)

3

IC Entry

The Entry way into the SVTC's Innovation Center showcase. This area will serve as an introduction piece to DuPont's history, current and future innovations. Visitors will be exposed to the various solutions DuPont is developing to address our societies most pressing challenges.

4

Showcase Area / Ahead

After experiencing the impactful messaging of the arboretum visitors will now get to see the innovative prototypes and current solutions that DuPont has developed. This area will entice the imagination of visitors and generate inspiration and creativity to collaborate over our materials and expertise.

5

6

Debrief Lounge & Labs

Once visitors have complete their tours of the center they will be able to sit down with their hosts and debrief on their experience. Users will also be able to learn and see the various labs and capabilities housed in the SVTC. Follow up sessions and workshops will be scheduled at this point.

7

Flex

Outfitted with the ability to host major events and seminars, the Flex space can be used by hosts and visitors to bring large groups together and collaborate. The flex area is outfitted with, live microphones and speaker systems, flexible furniture, a kitchenette and web conferencing capabilities.





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THANK YOU