

Performance
Engineered
Films™



NASDAQ: UNXL

Corporate Overview

July 2013



Important Cautions Regarding Forward Looking Statements

All statements in this presentation that are not based on historical fact are "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995 and the provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. While management has based any forward-looking statements contained herein on its current expectations, the information on which such expectations were based may change. These forward-looking statements rely on a number of assumptions concerning future events and are subject to a number of risks, uncertainties, and other factors, many of which are outside of our control, that could cause actual results to materially differ from such statements. Such risks, uncertainties, and other factors include, but are not necessarily limited to, those set forth under Item 1 "Risk Factors" in the Company's Annual Report on Form 10-K for the year ended December 31, 2012. We operate in a highly competitive and rapidly changing environment, thus new or unforeseen risks may arise. Accordingly, investors should not place any reliance on forward-looking statements as a prediction of actual results. We disclaim any intention to, and undertake no obligation to, update or revise any forward-looking statements. Recipients are also urged to carefully review and consider the other various disclosures in the Company's Annual Report on Form 10-K for the year ended December 31, 2012, as well as other public filings with the SEC since such date.

- **Company introduction**
- **Key product technology**
- **New hard coat resin technology for display applications**
- **Printed electronic projected capacitive touch sensor technology**

- **Public Company** – UNXL – NasdaqCM
- **Headquarters and Lab** – The Woodlands, TX
- **Key Products** - UniBoss™, Diamond Guard™
- **Manufacturing**
 - Lufkin, TX
 - Rochester, NY (Kodak) – September 2013
- **Employees** - 35

UniPixel Leadership Team

Reed Killion

President & CEO, Director

- Chairman Animal Innovations
- Trustee & Director Texas A&M Research Foundation
- President Transition Marketing
- VP Bus Dev. LogiCom

Rob Rusenko

VP Manufacturing

- VP – Gen Mgr. Scientific Games
- Snr Operations Mgr. DuPont Performance Mat'ls
- VP Operations Saint Gobain
- GE Plastics
- Allied Signal
- GE Master Black Belt

Jeff Tomz

CFO & Secretary

- CFO of Isolagen, Inc.
- A Principal at Benchmark Equity Group, Inc.
- Serves on board of directors of various companies
- Director of InfoHighway Communication Corp.
- CPA with Arthur Andersen Worldwide

Dr. Robert Petcavich

CTO, Sr. VP & GM

- Sr. VP & CTO of Lumera Corporation
- Chairman, CEO and CTO of several advanced materials and medical informatics technology companies (Alife Medical Inc., Polytronix Inc., Planet Polymer Inc., Alphascibe Express Inc., Material Sciences Corp.)
- Texas Instruments

Dan Van Ostrand

Sr. VP, Engineering, R&D

- UniPixel Founder
- Founder & CEO of two technology companies
- Engineering Manager at Jet Propulsion Laboratory, Teledyne, Magnavox, and Informatics

Robert Berg

Sr. VP Global Sales

- VP Sales & Marketing at Multek
- VP & GM Touch Solutions Business, Sheldahl Materials (Multek)
- National Sales Manager, Panasonic Electronic Mat'ls
- VP Sales, Advanced Transformer Co. (Philips)

Our Focus:

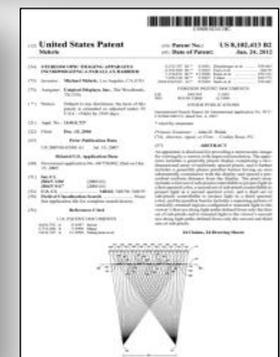
Performance Engineered Films™ (PEF)

- Modify industrial base films at the micro/nano level to improve functional properties for diverse target markets.
- Drive improvements in surface geometry, chemical and wear resistance, optical and/or electrical properties.

Touch and display target markets:

- Flexible Printed Electronic Films (e.g. touch sensors)
- Protective cover layers for displays & decorative graphics (e.g. cover glass replacement)
- Lighting & Display Films

Building a Robust IP Portfolio



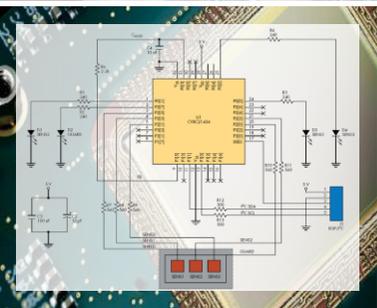
Three Issued Patents & 79 patent Applications Covering Key Areas

Capabilities Enabled



Advanced (Unique) Process Technology

- Large Area printed patterns
- Micro-resolution printed patterns
- Roll to roll flexible printed electronics



Novel Touch Sensor Architectures

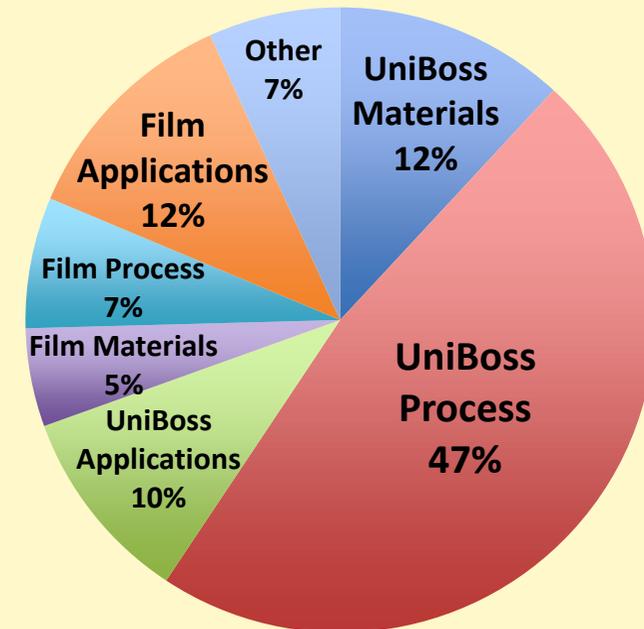
- Improved performance
- Micro-fine line invisibility
- On-cell touch sensors



Chemistry

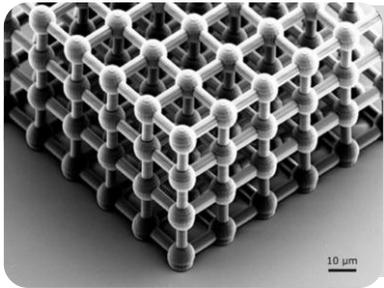
- Ink Formulation
- Ink Process

By Category

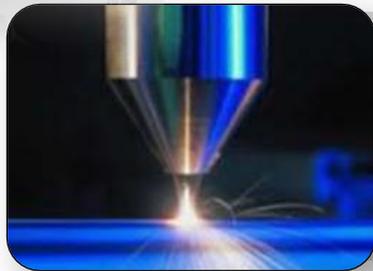


35 New Patent Applications in Process

Total Project Involvement



Design- From Idea to Drawing



Process and Master Tool Development



Manufacturing – Prototype to
Volume Roll to Roll Processes.

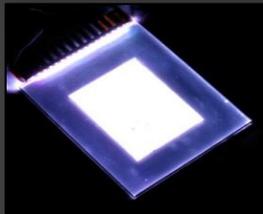
Diamond Guard™ Display Films



**Cover Glass
Replacement**



**Protective Cover
Films**



Optical Films

UniBoss™ Flexible Printed Electronics



Touch Panel Sensor



Specialty Sensors



EMI/RFI Shielding

Our Business Model

	UniBoss™	Diamond Guard™
Disruptive Technology	Printed Projected Capacitive Touch Sensors to replace ITO	Protective Hard Coat Film to replace glass
Huge Markets	Touch sensor market projected to grow from \$13B to \$32B by 2018	Cover glass replacement and decorative film markets \$1B today
Strategic Partnerships	<p>Touch Controller Manufacturers Customers/Partners</p> <ul style="list-style-type: none"> • Major PC Manufacturer • Major PC Ecosystem Partner <p>Strategic Manufacturing agreements- Kodak</p>	Carestream – production and global distribution partner

Diamond Guard™ Hard Coat Film

- Improved product durability
- Reduced weight
- Flexible display options needed
- Thinner design requirements
- Superior Display Performance
 - High Definition
 - Optical Clarity



The package challenge - Glass

Diamond Guard™ High Performance Hard Coat Film

Optically Clear

- >90.5% Transmission
- <0.6% Haze

Glass like surface – Rq = 13.9 nm

Hard wear resistant surface –

- **ASTM 6H**
- **Taber** – CS-10 wheel – 500 cycles – 500g - Haze - no change
- **Wyzenbeek** – Denim – 1000 cycles – 500g - Haze – no change
- **Bayer** – Luminous Transmission – post Bayer - No Change

Two Product Options Available

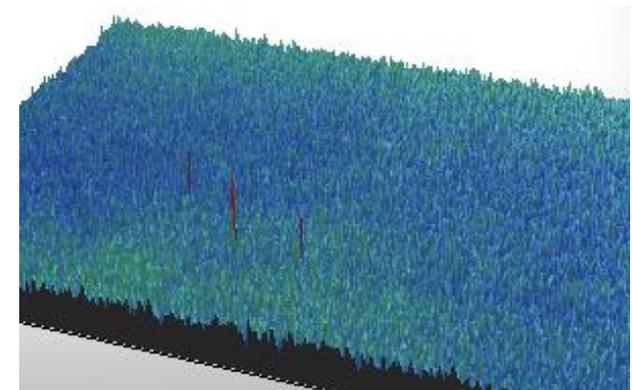
- **Hard Coat PET films - 100µm and 175µm films**
- **Licensed Resin Sales**

Diamond Guard™ Film Layers

Diamond Guard Coating



Rq = 13.9nm



Glass vs. Diamond Guard[®]

	Glass	Diamond Guard [™]
Shatterproof	No	Yes ✓
Scratch Resistance	Very Good ✓	Good
Weight	Heavy	Light ✓
Minimum Effective Thickness	0.5mm	0.12mm ✓
Materials Cost	High	Low ✓
Handling Cost	High	Low ✓
Yield	Low	High ✓
Shapes	Flat only	Almost any shape ✓
Film Roll	Limited	High Volume ✓

**Old
Technology**



**UniPixel
Technology**



Cover Glass/Lens Replacement

- Diamond Guard + PMMA lens
- Diamond Guard + Polycarbonate lens
- Diamond Guard direct bond to LCD
- Diamond Guard direct bond to polarizer



Protective Films

- Consumer products
- Capacitive switches, membrane switches



Commercial & Industrial Decorative Films

- Can easily print decorative border and logos on backside of DG film to cover bezel circuits on LCD displays & touch sensors
- White goods
- Automotive trim - applique

\$1B+ Annual Cover Glass Replacement & Decorative Market¹

Trends

- Growth in 2D and 3D complicated molded lens in new consumer product designs
- Touch growth in automotive and transportation applications
 - Glass prohibited in automotive cockpit.
 - Birefringence issues with PET films, polycarbonate preferred.
- Drive for process simplification and cost down
 - Drive to eliminate extra lamination steps.

Solution

- Provide Diamond Guard Resin for resale in custom coating applications
 - Spray
 - Slot die
 - Gravure, micro-gravure
 - Other

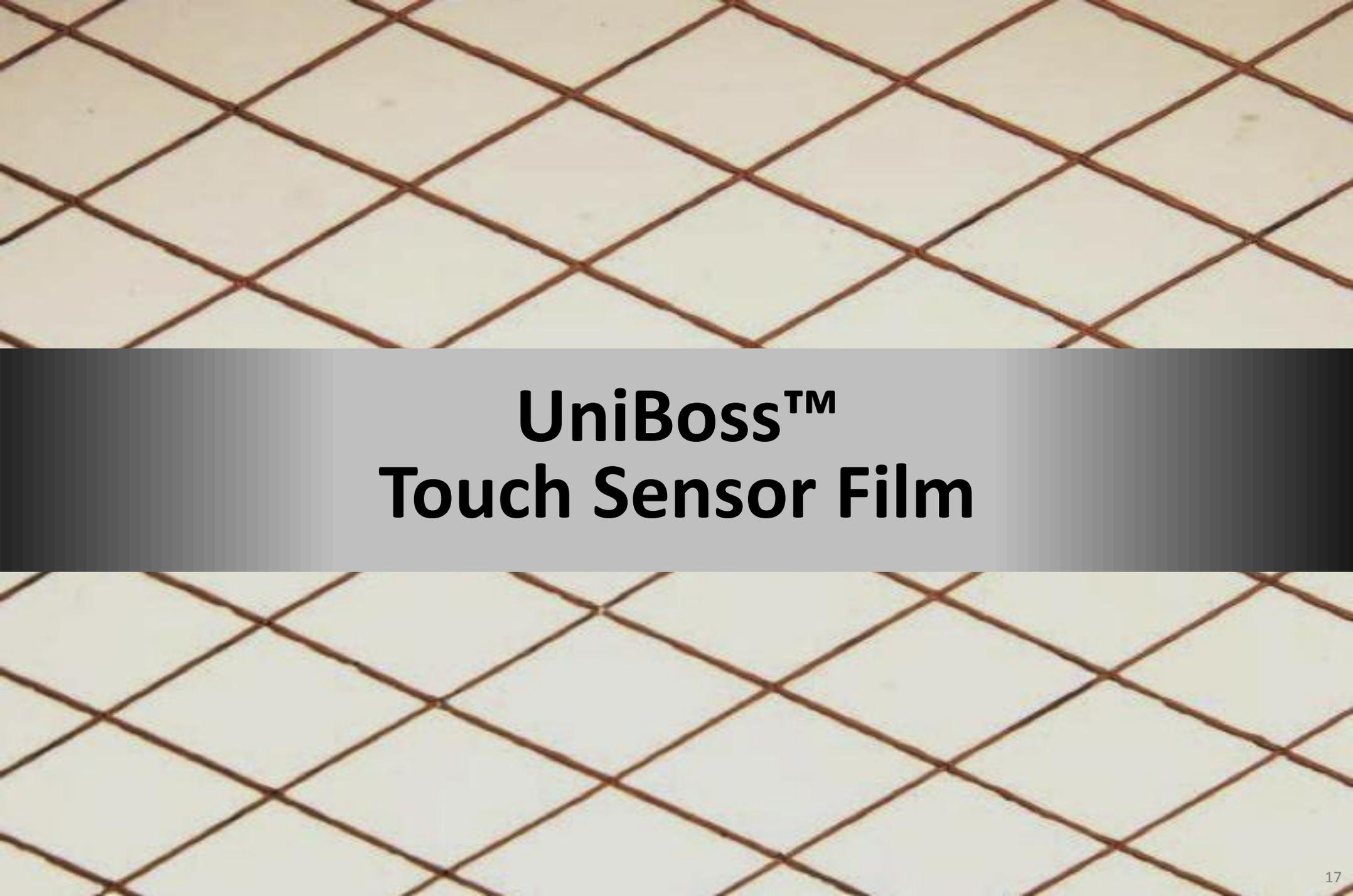


Business Model: Licensed Preferred Pricing & Capacity Agreement

- Focused sale to limited number of Tier One manufacturers in select target markets
- License granted with up-front fee.
- Guaranteed resin supply
- Technical service and application development support included.
- Manufacturing process development support included
- Discounted resin pricing

First Mover Advantage

- Special introductory pricing offered for first two completed licenses.
- Pricing valid for first year purchases.



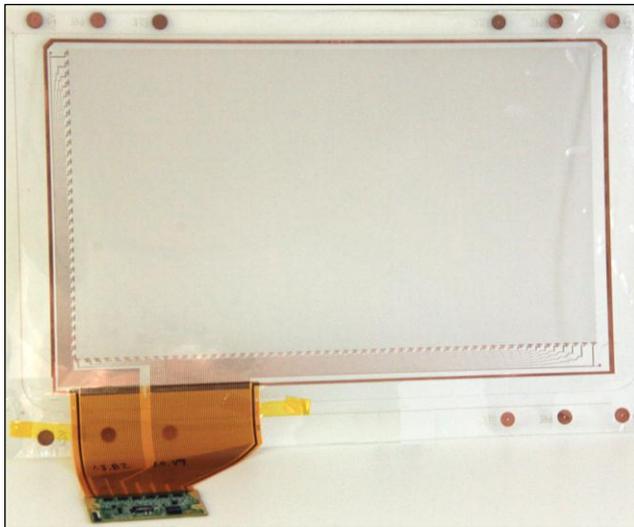
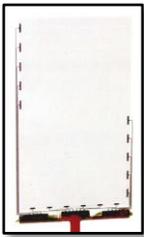
UniBoss™
Touch Sensor Film

- **Touch is interface technology of choice.**
 - Smartphone Adoption - ~ 100%
 - Tablet Adoption – 100%
 - **Notebook – 8% growing to > 60%**
 - **All in One – 4% growing to >30%**
 - New Products – POP, POI,
- **Multi-touch and fast response required**
- **Reductions in touch component cost required to drive expanded adoption.**
- **Current Technologies reaching cost/performance limits**
 - ITO technology limited to smaller sizes.
 - ITO can not meet new faster touch response rates
 - Glass based touch sensors require large CapEx and have low yield.

UniBoss™ is a printed copper clad electronic metal mesh projected capacitive touch sensor solution

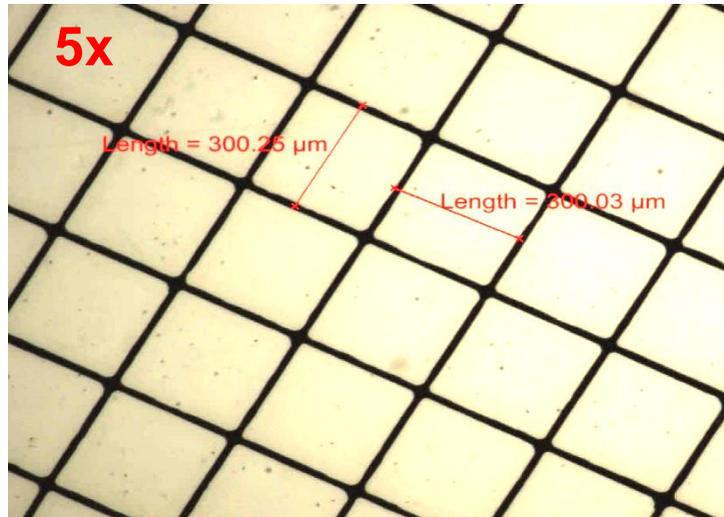


- **Fully additive** R2R process
- Single pass **double sided printing** process.
- Sensor area and bezel traces printed at same time
- Suitable for all size applications



UniBoss - Perfecting the Process

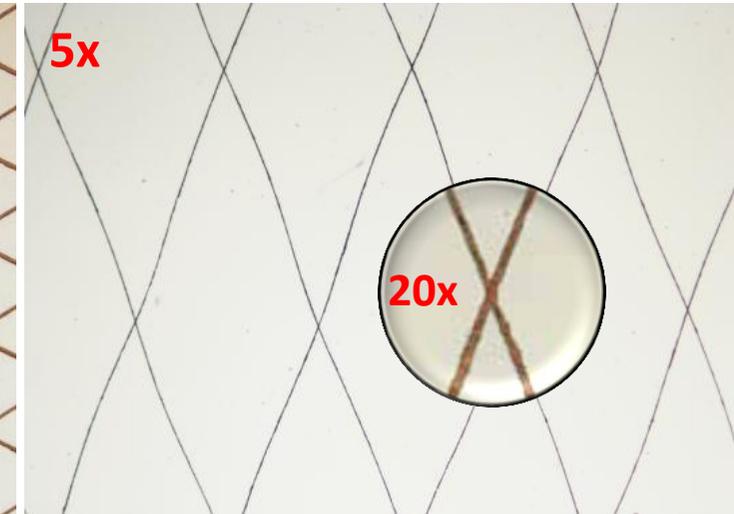
2011
~20 μ m lines



2012
~12 μ m lines

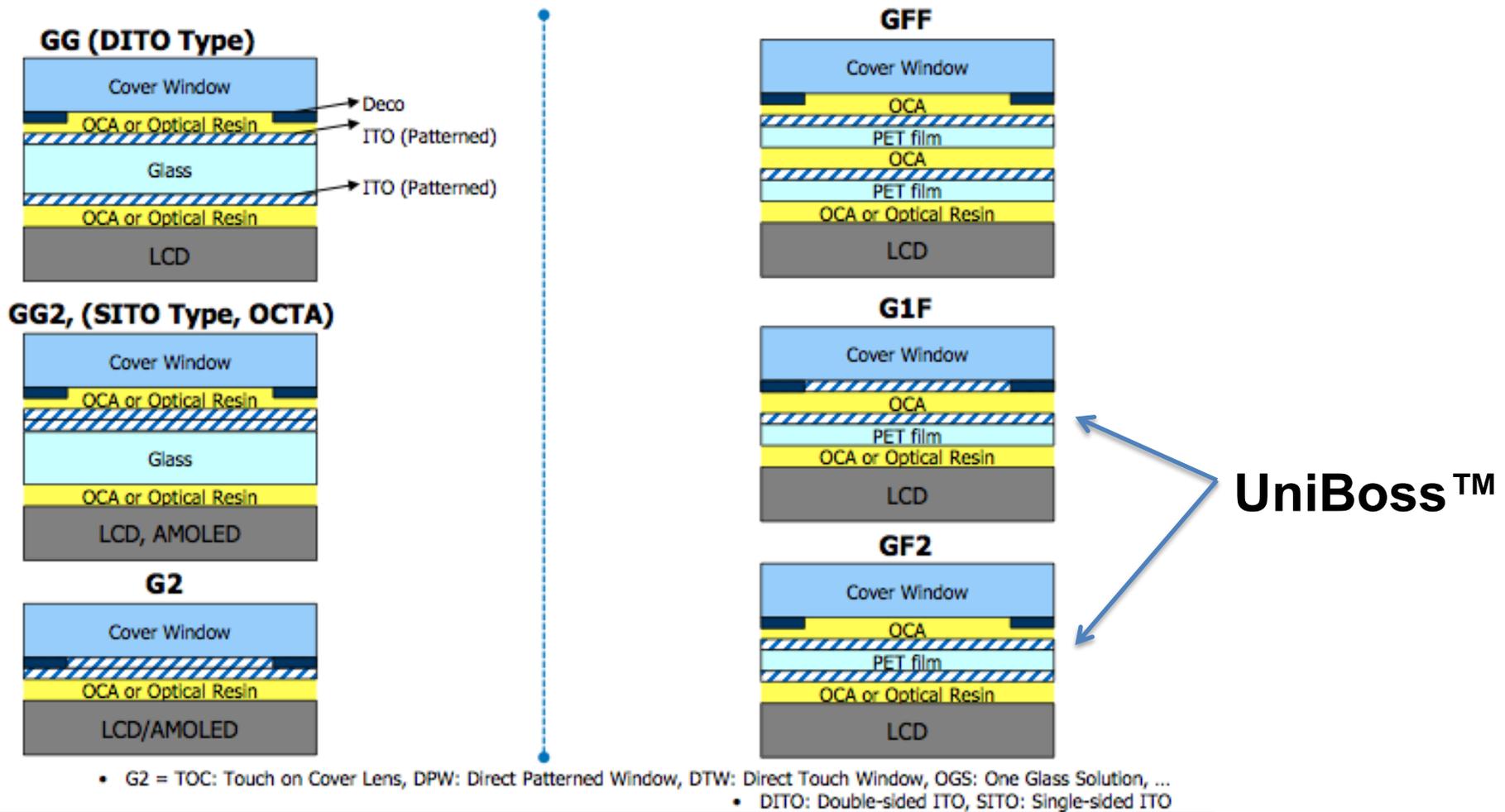


2013
~6 μ m lines



Print one side or both simultaneously

Where does it Fit?



Source: DisplayBank

UniBoss™ Typical Touch Sensor Technical Specifications

Specification	Value
Film Specification	0.004" and 0.005" (100µm and 125µm) optically clear PET film
Sensor metallization	Copper / Nickel
Sensor format	Single and doubled sided fully additive printing process
Sensor Trace Thickness	<0.00125mm
Sensor Trace Width	6+/- 1 µm
Sensor Trace Pitch	Varies by design and sensor controller, typically 150-300µm
Bezel Trace Width	> 30 µm - varies by sensor design
Bezel Trace Pitch	> 70µm - varies by sensor design
Touch Module Transmission (6 µm trace, 300µm grid)	>92%
Adhesion	Passes scotch tape peel adhesion test
Operating Temperature	-20°C to +65°C
Conductivity Uniformity	+/- 10% across the grid
Sheet Resistance (6 µm trace width and 300µm grid spacing)	<10 ohm/sq.
Bulk Metal Resistance	<0.08 ohm/sq.

Touch Sensor Technology Comparison

	UniBoss™ Metal Mesh	ITO on Film	ITO on Glass	Carbon Nanotubes	Silver Nanowires
Product Type	Patterned Sensor	Coated Film	Coated Glass	Coated film	Ink, Coated film
Patterning Process	Additive printing complete sensor	Photolithography Laser ablation	Photolithography Laser ablation	Photolithography Laser ablation	Photolithography
Transmission(%T)	89-94%**	82-90%	88-92%	80-85%	90-91%
Haze	<0.6	0.6-1.5%	0.1-0.3%	> 1.5%	1.0-1.5%
Color	Gray	Yellow	Yellow-Gray	Black	Silver - Green
Transparent?	Yes*	Yes	Yes	Yes	Yes
Resistance	7-10 Ohm/sq.	100-500 Ohm/Sq.	50-500 ohm/sq.	> 300 ohm/Sq.	> 60 ohm/sq.
Flexibility	High	Semi-rigid	rigid	Flexible	Flexible
Feature size	<6μm	> 50μm	>50μm	> 100μm	> 30μm
Scalability	50 in. dia +	< 23 in dia.	< 23 in. dia	Unknown	< 23 in dia.
Key issues	Visibility - Moire	Brittle	Brittle	Manufacturability	Durability
		Requires Index Match, Optics at low resistance	OGS/SOL complex process low yields	No low resistance options, material hazards	Scalability, Environmental Reliability

* Sensor is transparent

** Transmission range dependent on design

Advantages of Film

UniBoss™

	Price	Safety	Light & Slim	Optical Feature	Narrow Bezel	Process Flexibility
ITO Film	○	○ 	○ 	○	○	○ 
ITO Glass	○	○	○	○ 	○ 	○

UniBoss™

Source: DisplayBank

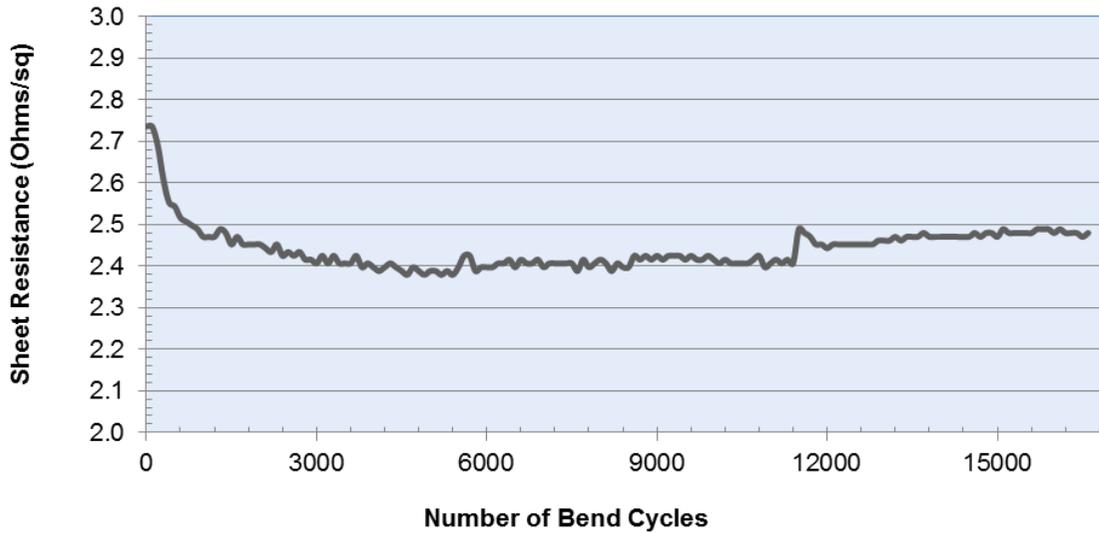


UniBoss™ Touch Sensor

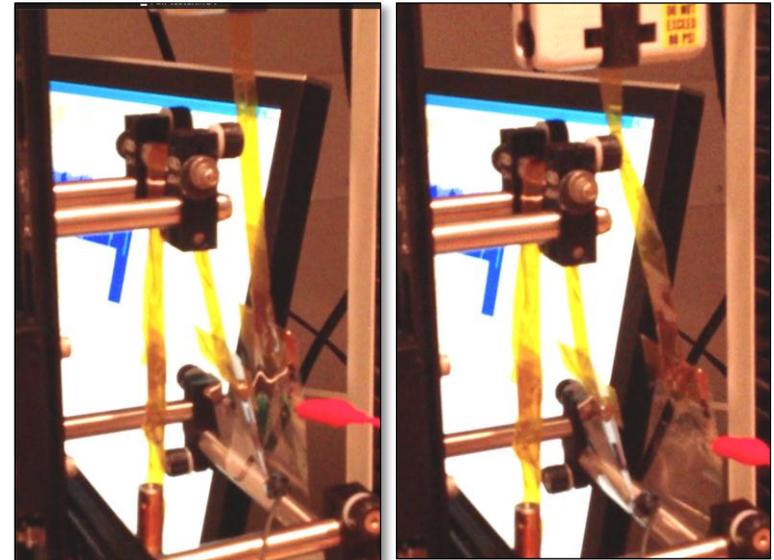
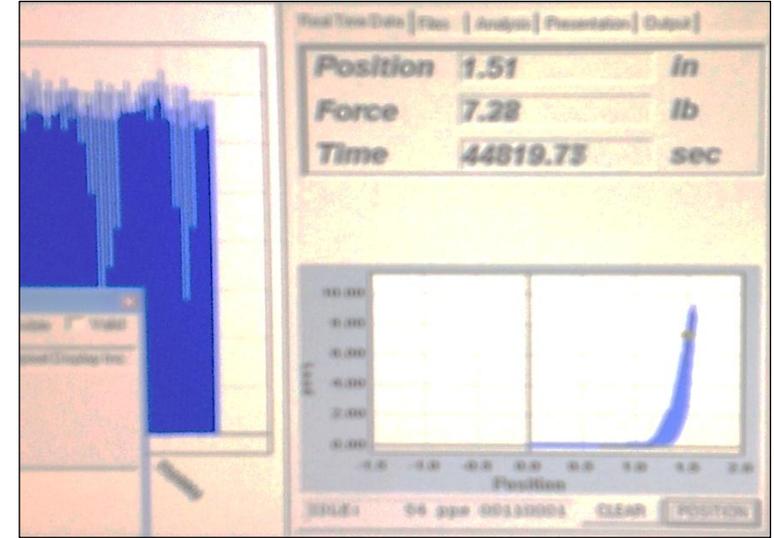
Performance Comparison

Durability – Bend Test

UniBoss™ Grid - Bend Test with 7lb Weight
(20μm wide Cu, 600μm square grid on 4mil PET)

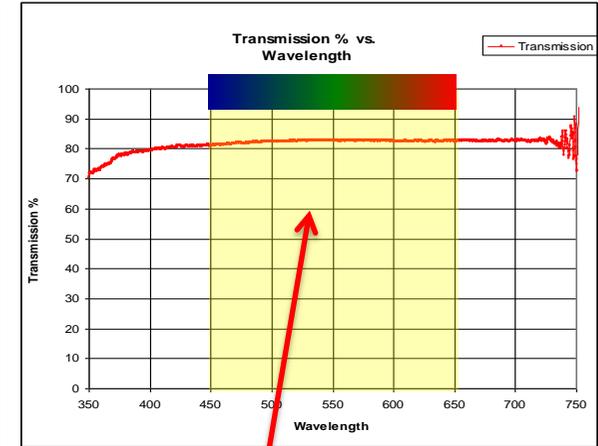
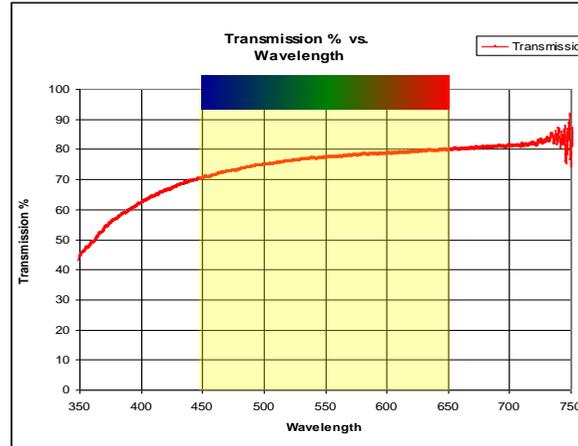
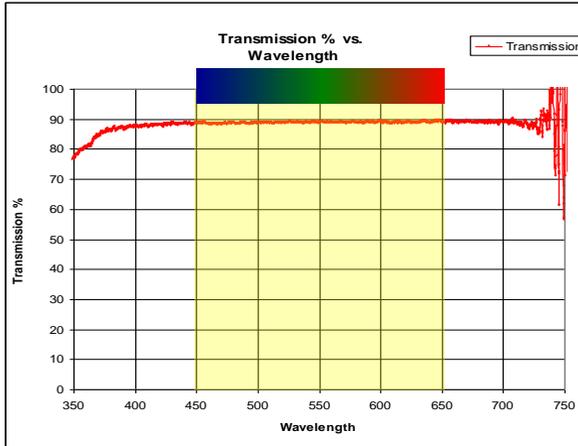


- 20,000 cycles, 7lbs weight, 12mm dia. rod
- Change in resistance < 0.1 Ohms/sq.



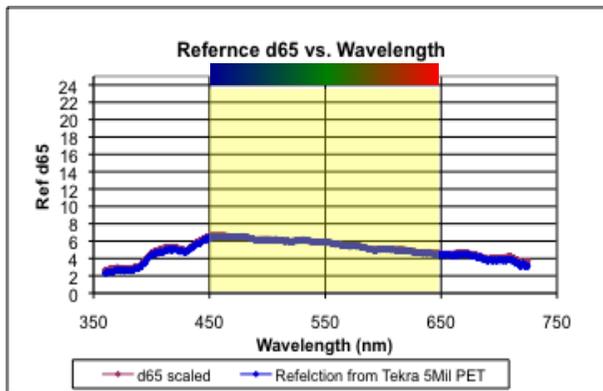
Optical - No Color Shift

Transmission

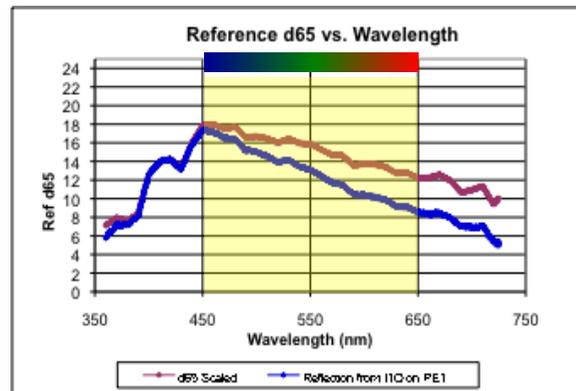


NO color shift

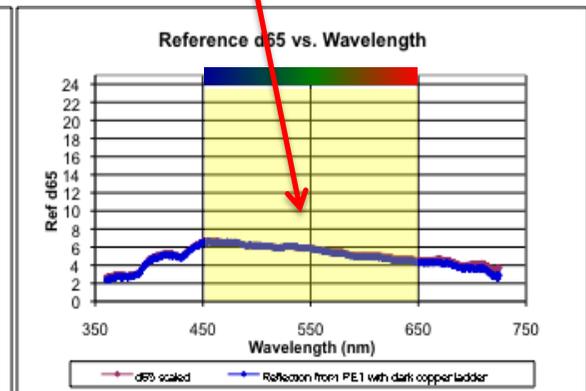
Reflection



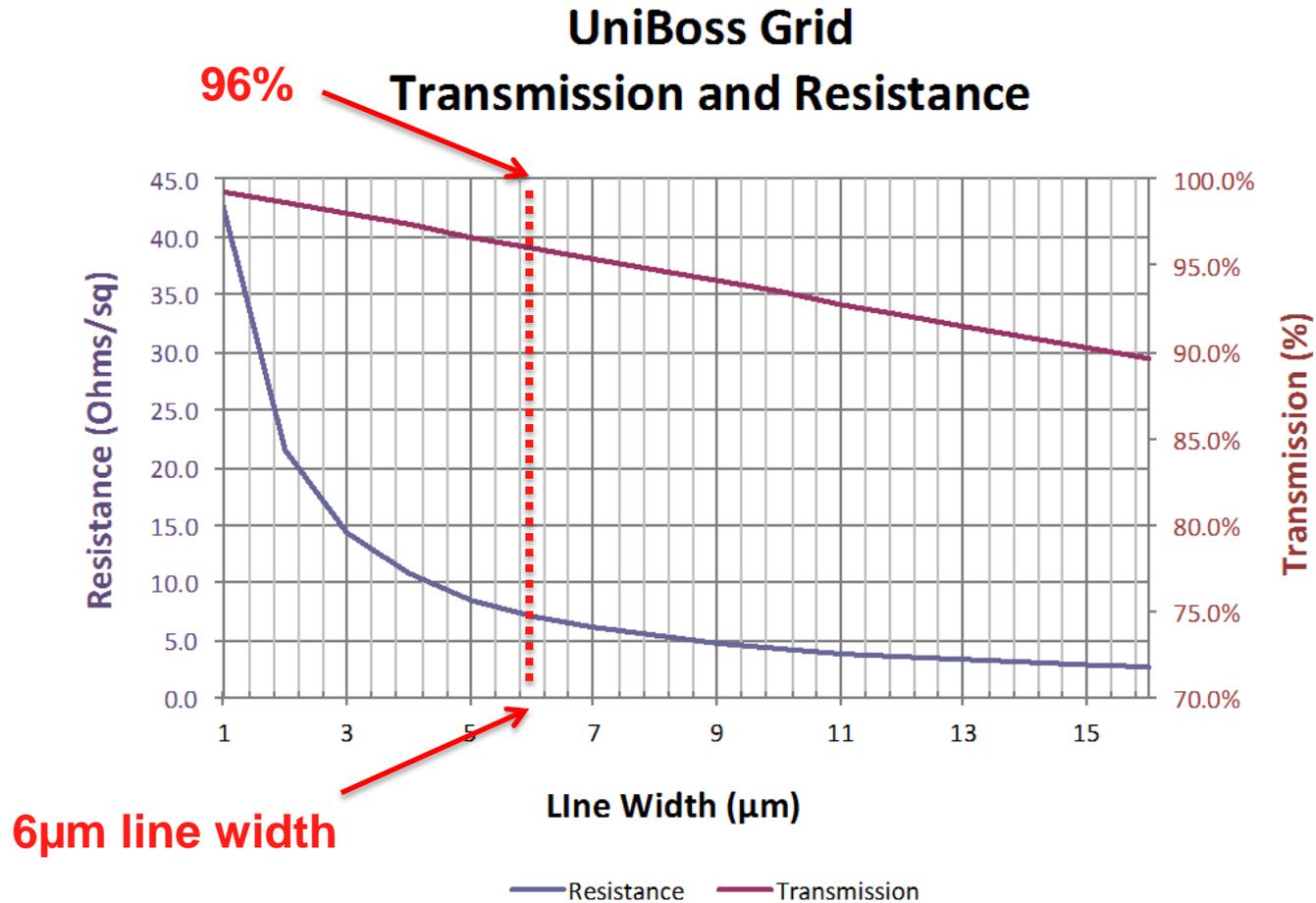
PET



PET + ITO



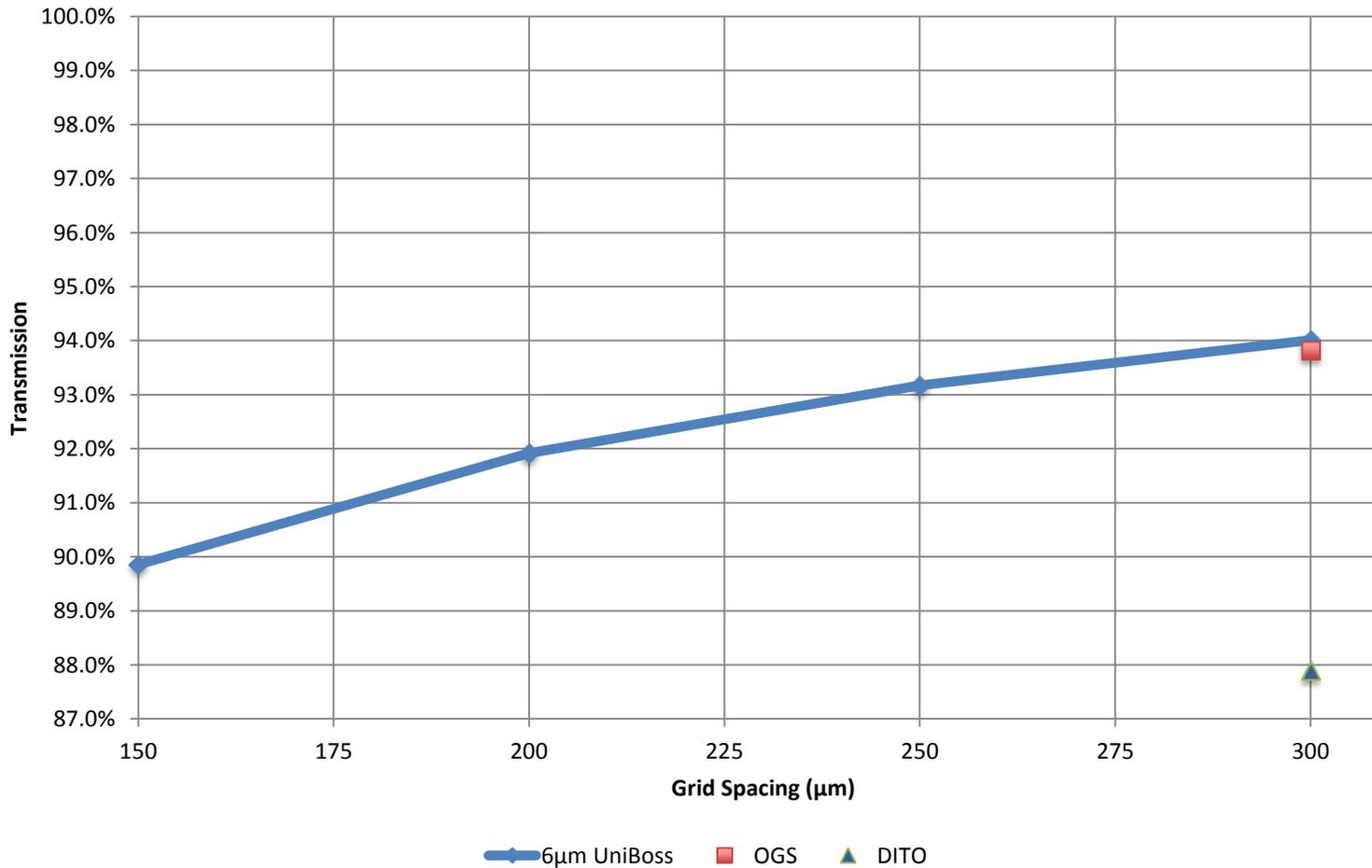
PET + UniBoss



Optical: 300µm grid spacing (2 side grid)
Electrical: 600µm grid spacing (1 side grid)

Light Transmission Comparison

UniBoss Transmission (in full stack between LCD and Cover Glass) vs. Grid Spacing at various line widths



Touch Sensor Stack-up



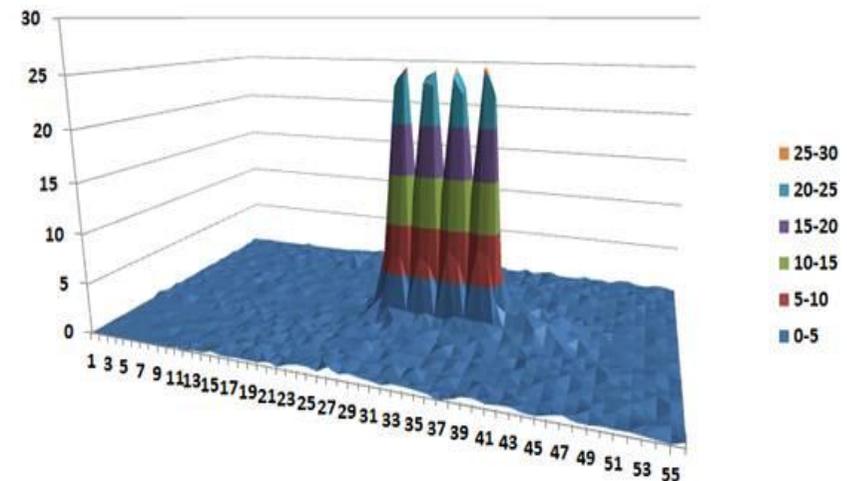
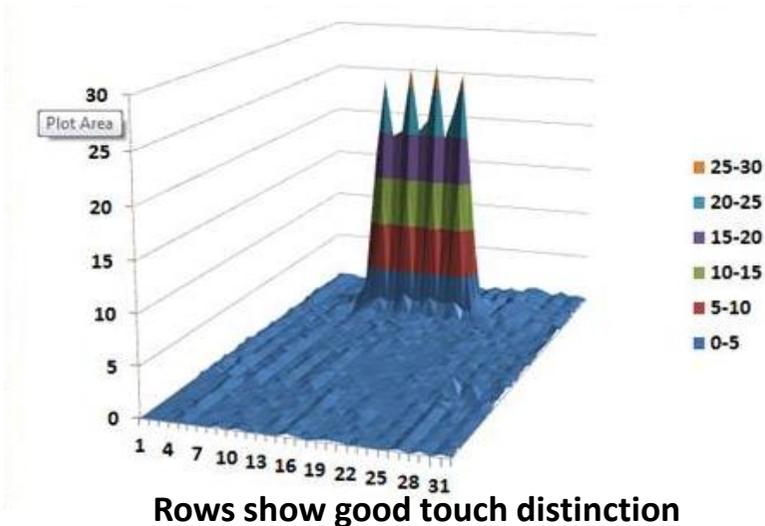
OGS = One Glass Solution
DITO = Dual ITO

Touch Response Advantage

UniBoss Touch Sensor Performance Test

- All the tests taken using N-trig analysis tool
- Touch Response - 30% higher compared to similar sensor using ITO electrodes
 - Improved accuracy
 - Faster tracking
 - Improved touch distinction between multiple touches

	ITO Sensor			UniBoss Sensor		
Touch Point	Touch Response %	Touch Response	SNR Signal level	Touch Response %	Touch Response	SNR Signal level
1	21.1	575.7	18.3	29.3	425.9	15.7
2	22.4	645.4	19.3	29.9	481.4	16.8
3	24.3	586.2	18.5	28.8	464.2	16.4
4	21.6	531.6	17.6	28.9	415.4	15.5
Center	23.4	598.8	18.6	28.1	431.9	15.8
AVG	22.5	587.5	18.5	29.0	443.8	16.0
MAX	24.3	645.4	19.3	29.9	481.4	16.7
MIN	21.1	531.6	17.6	28.1	415.4	15.5



Multiple Development Designs above 10" with Multiple Controllers



10.1"



11.6"



13.3"



15.6"

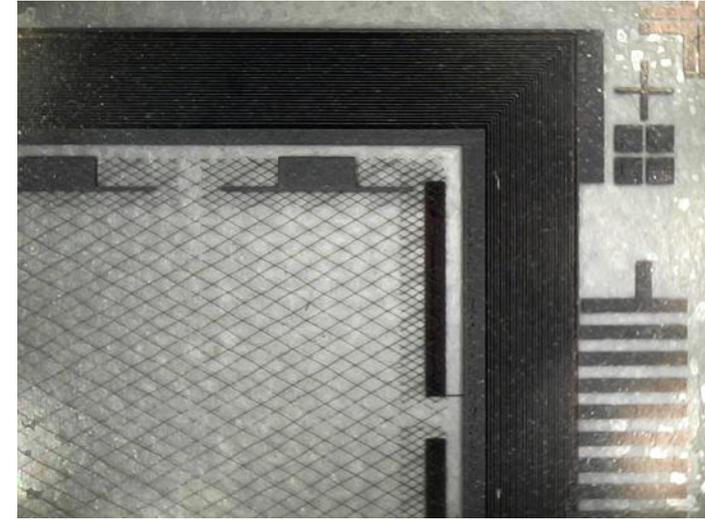
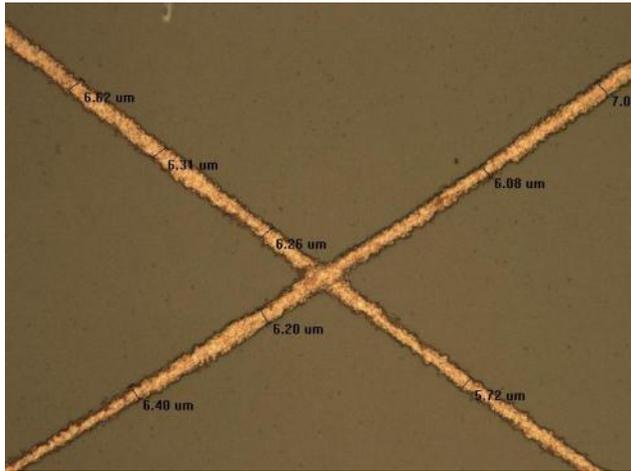


23"

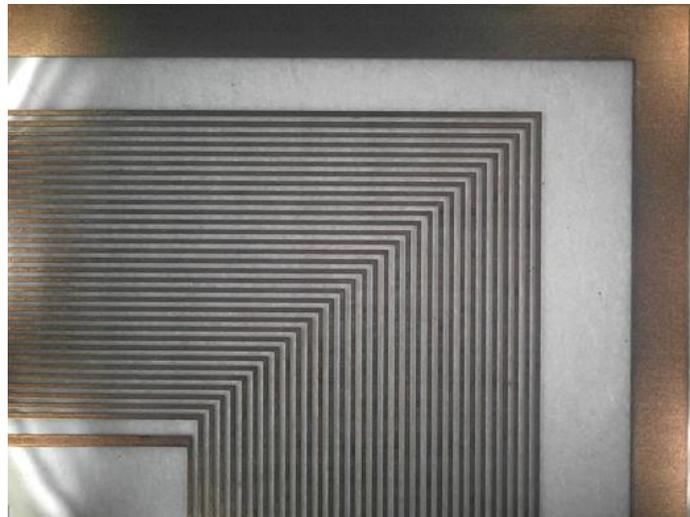
The high conductivity of UniBoss touch sensors allow:

- Narrow product borders with high resolution bezel traces.
- Precise low latency touch performance even with large size displays.
- Lower overall total touch cost
 - ✓ Touch sensor
 - ✓ Fewer controller needed
 - ✓ Higher yielding process

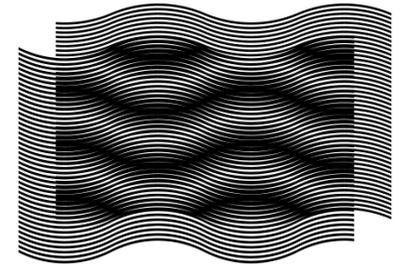
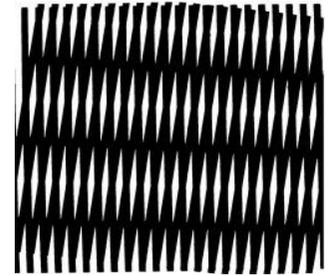
Printing Examples



6μm+/- 1um mesh



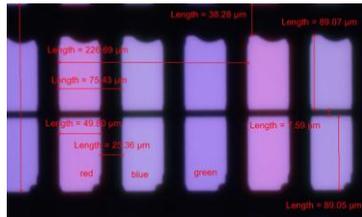
- Moiré is an interference pattern created when two or more meshes are overlaid either at an angle, with different spatial frequencies.
 - For touch screens, the display sub-mask interacts optically with capacitive grid overlay
- Moiré interference can be rendered undetectable for all display sizes and pixel sizes
 - Force fringe spatial frequencies beyond the resolution limit of the eye/display.
 - Reducing fringe contrast below detectable levels by minimizing line width.
- UniPixel developed a sophisticated optical analysis tools to analyze specific sub-pixel and mesh configurations and design patterns to minimize Moiré.



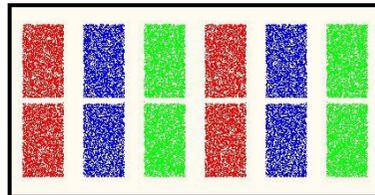
LCD Pixels

Accurate representation of sub-pixel mask

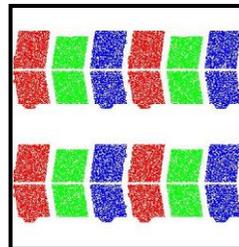
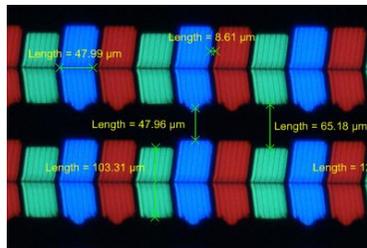
Virtually any arrangement can be implemented



(photo of unlit display)



Model sub-pixels

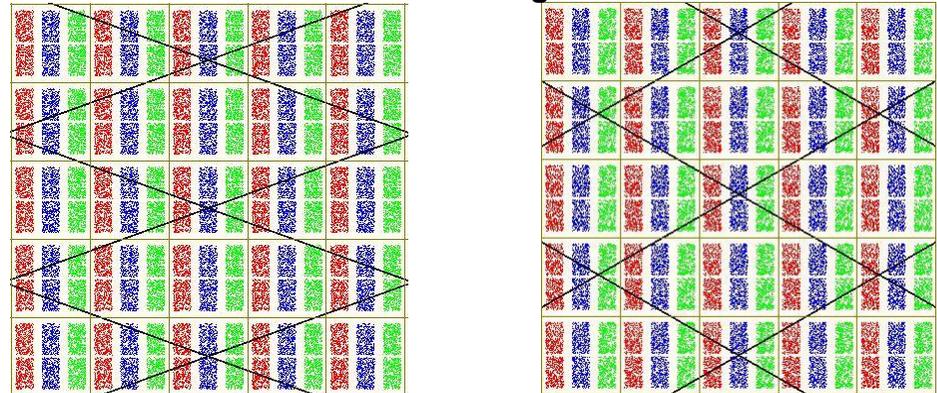


Wire Mesh

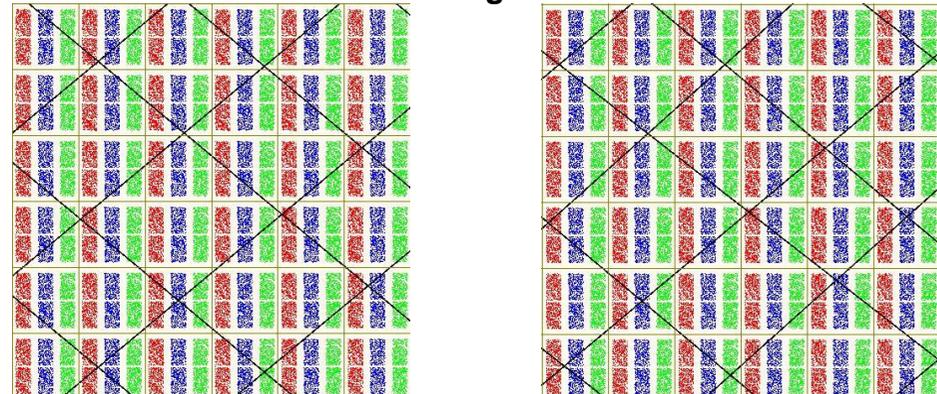
Mesh can have any angle, orientation, spacing or width

Tolerance analysis available

Mesh Angle



Mis-alignment



translational

translational & rotational

Rendering of Moiré Fringe Patterns

Diamond Pattern (Pixel size to Mesh spacing ratio)

←-----→
5°

10°

15°

20°

25°

30°

35°

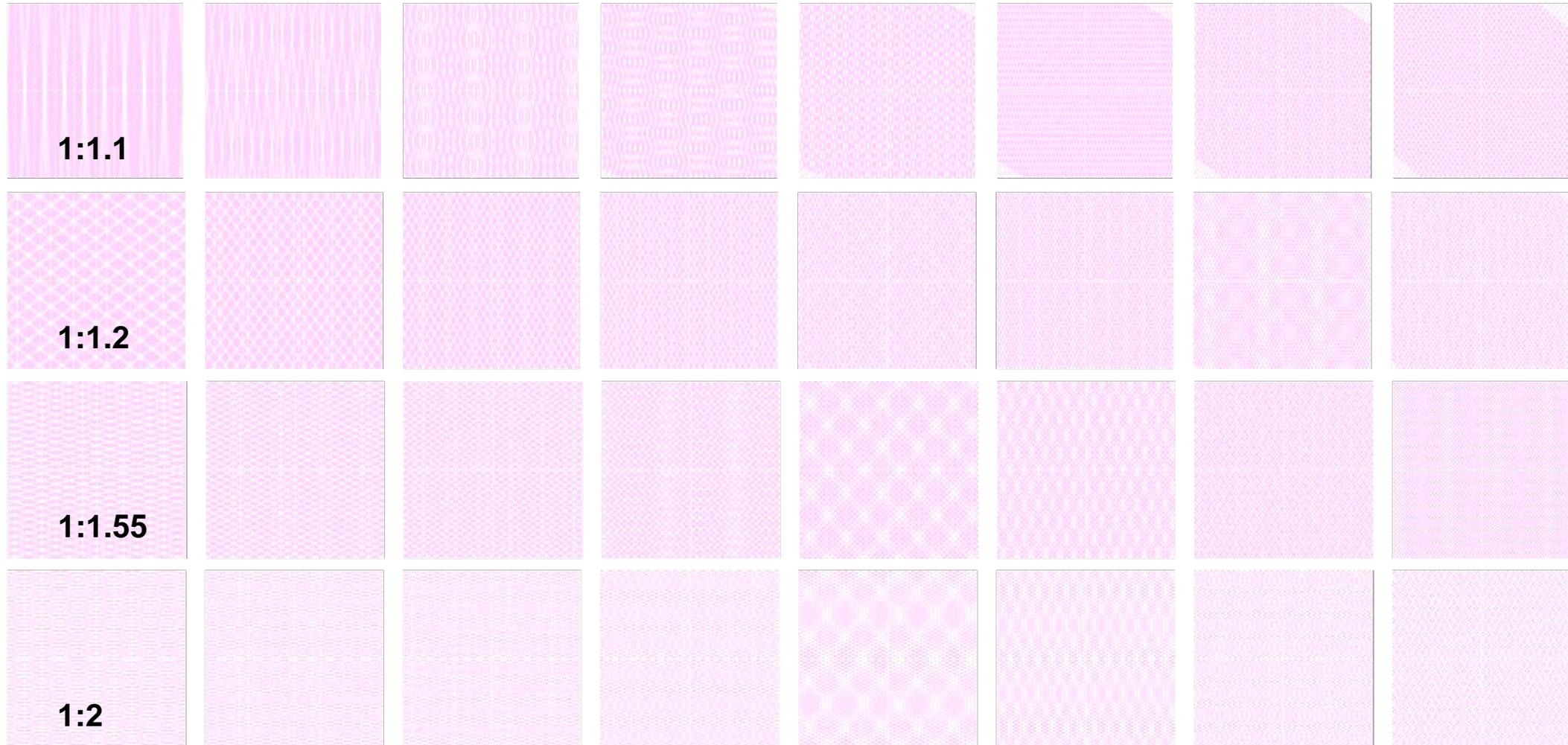
40°

1:1.1

1:1.2

1:1.55

1:2





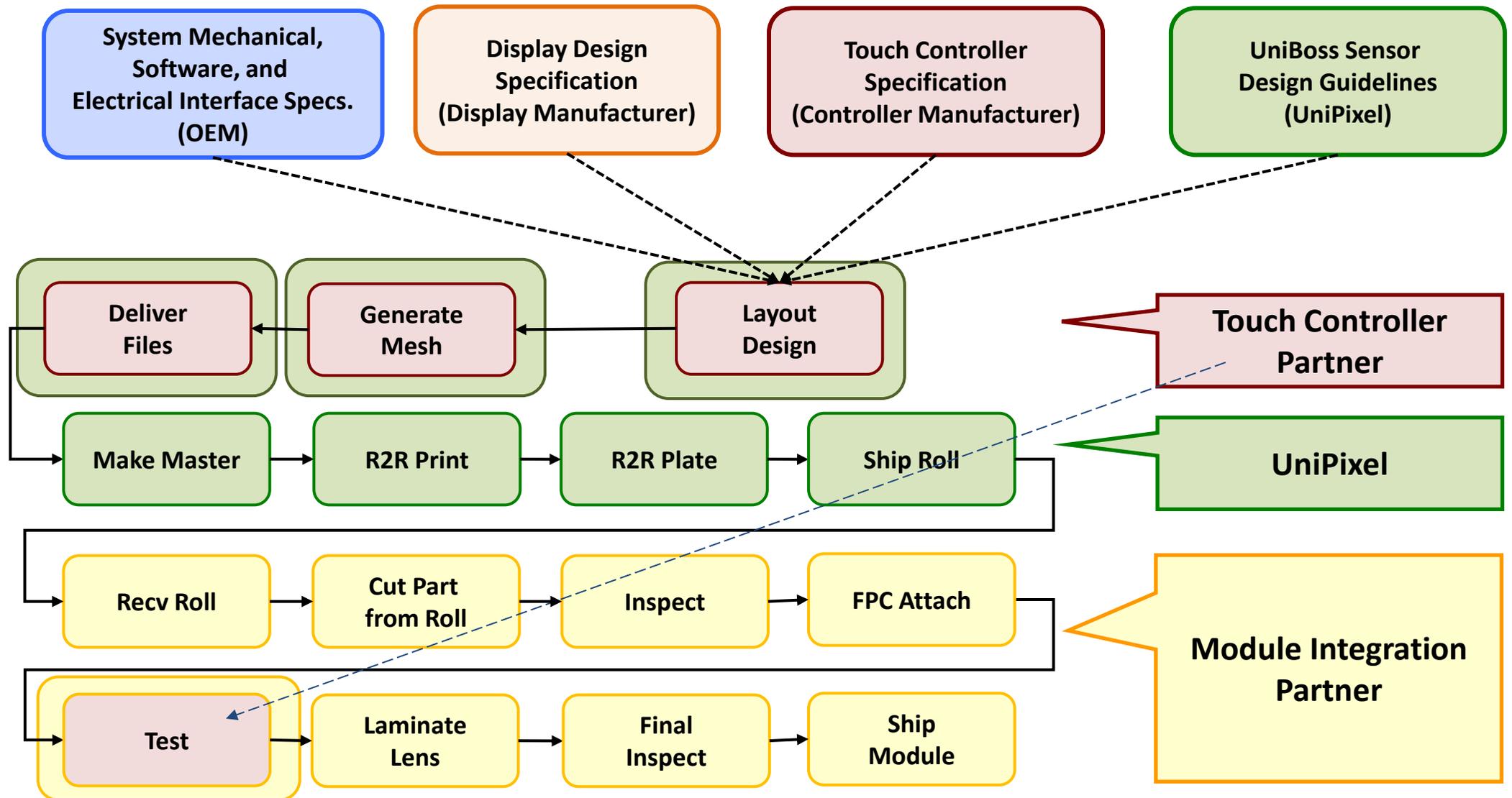
- **Process is quick**
- **One formula for multiple display vendors**

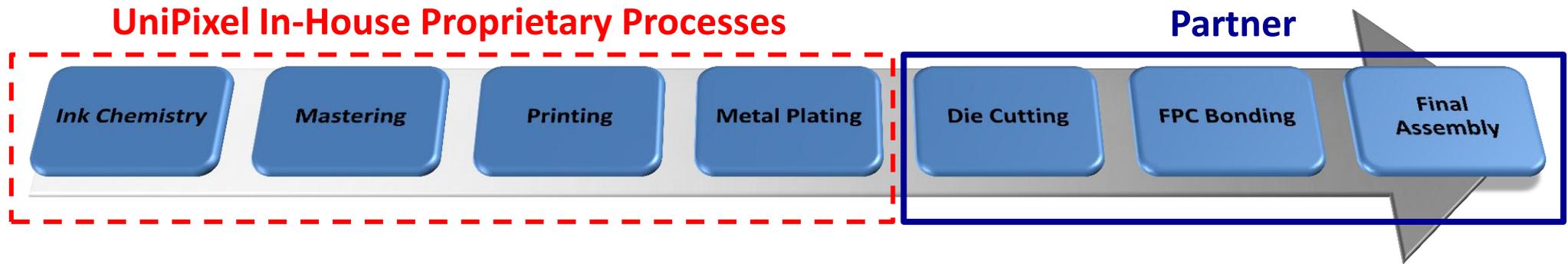




Production Roadmap

Touch Module Manufacturing Process Flow





Partners - Final touch module assembly

Partner Focus – Building a back-end supply chain

- ODMs
- Display Panel Manufacturers
- Touch Module Manufacturers
- Touch Controller Manufacturers

Eastman Kodak Manufacture & Supply Chain Partner

Kodak

- Apr 16, 2013, entered manufacturing & supply agreement with Kodak to support **production build out** of UniBoss touch sensor
- Jointly constructing a state-of-the-art manufacturing & testing facility, with initial **~100,000 sq. ft.** of manufacturing space for UniBoss roll-to-roll printing and plating lines
- Kodak's synergistic infrastructure allows complete vertical integration of manufacturing
- **\$24M** is being allocated in 2013 to improve and equip the facility, including **two printing** and up to **15 plating lines**

Eastman Business Park, Rochester, NY



1,200 Acre Technology Center & Industrial Complex

New UniBoss Manufacturing Facility



UniBoss Touch Sensor Value Proposition

✓ Performance

- Lower resistance
- Higher scan rates – reduced latency
- Equal or better optical properties than ITO solutions
- Mechanically durable/robust/flexible

✓ Scalability

- Small form factor to large form factor (2 in to 42 in dia.)
- Prototype to high volume manufacturing
- Suitable for optical and non-optical applications

✓ Cost

- Green Process - **fully additive R2R process** results in minimal waste
- Four step process reduces infrastructure cost
- Competitive **low cost** process





Thank You!

