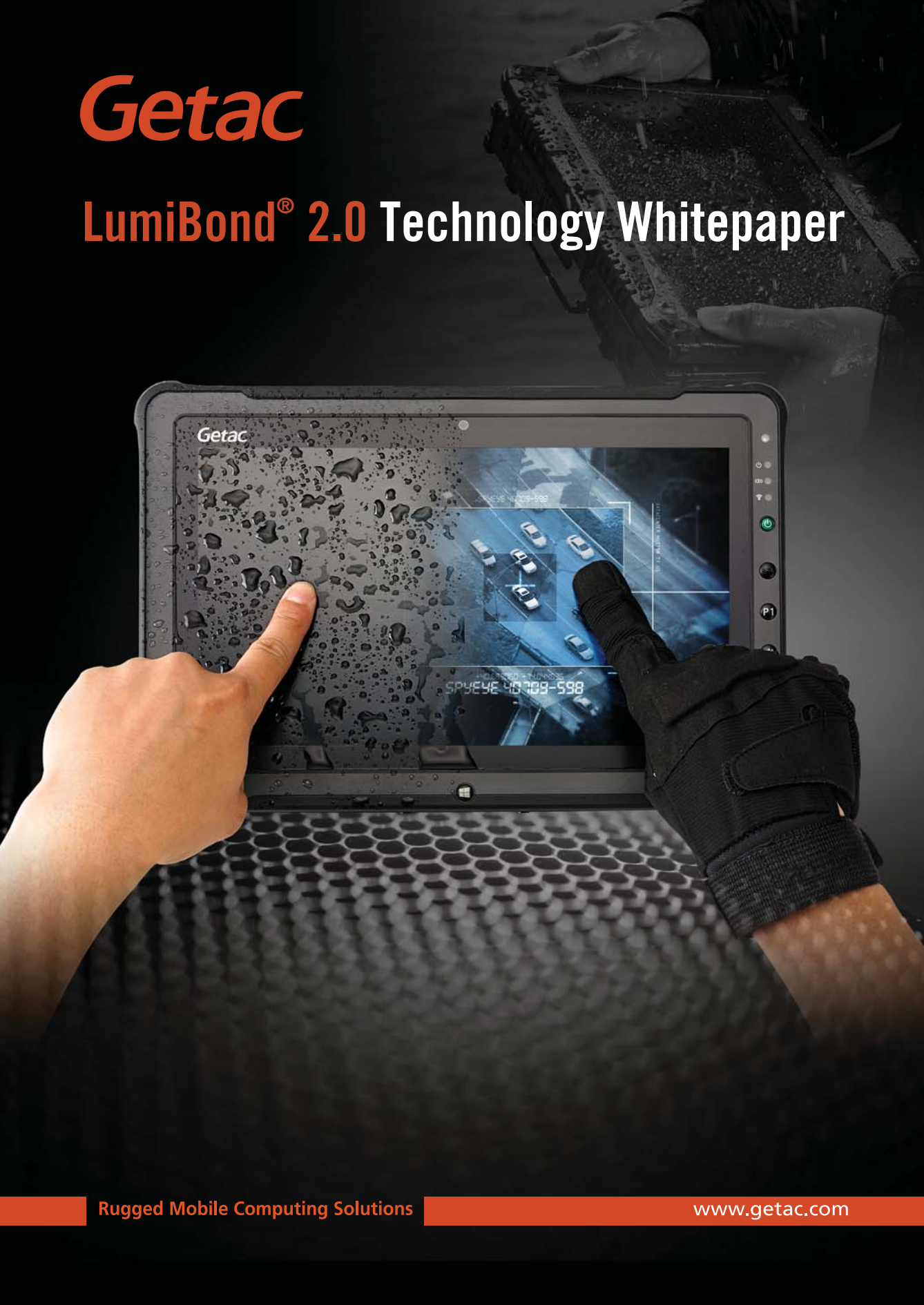


# Getac

## LumiBond® 2.0 Technology Whitepaper



# LUMIBOND® 2.0

## Better, brighter, and stronger touchscreen experience

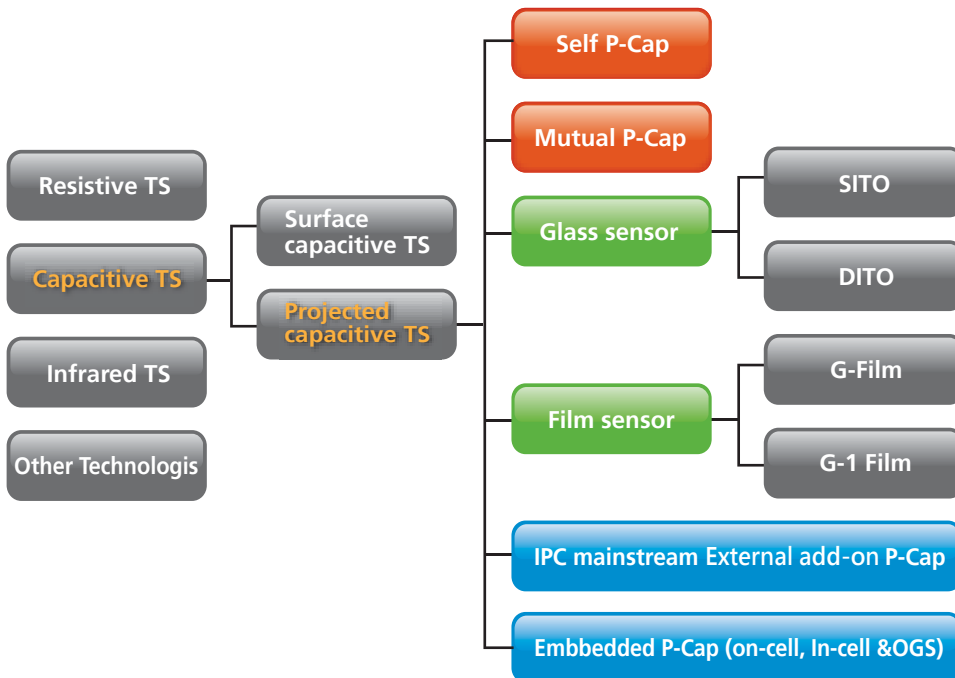
Getac proprietary Lumibond® 2.0 technology is a high performance touchscreen empowered by Getac breakthrough direct bonding process on the high brightness LCD and state-of-the-art P-cap type touchscreen. For those who have to work under extreme conditions, a reliable touchscreen for real-time data exchange is crucial.

This whitepaper will start with an overview introduction of the touchscreen, and then describe the strengths of Getac LumiBond® 2.0 technology, which brings a new rugged devices user experience to various and challenging environment usage.

### Touchscreen introduction

The touchscreen can be categorized into three main types: resistive, capacitive, and infrared touchscreens. According to projected capacitive touchscreens are the most prevalent technology for a variety of applications ranging from consumer to commercial devices in retail, gaming and signage. It has the highest penetration rate and will be the mainstream for more than a decade in the consumer and commercial market. We will drill down from projected touchscreen and dig out what type of touchscreen Getac products uses and what advantages it brings.

### Projected touch screen



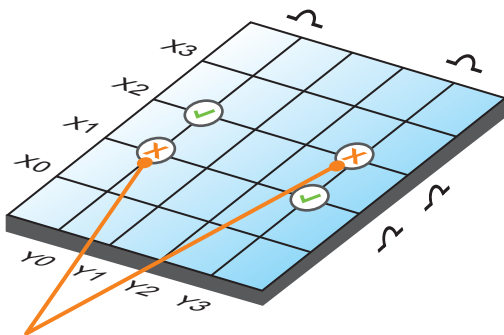
P-Cap technologies detect touch by measuring the capacitance at each addressable electrode. When a finger or a conductive stylus approaches an electrode, it disturbs the electromagnetic field and alters the capacitance. This change in capacitance can be measured by the electronics and then converted into X, Y locations that the system can use to detect touch. There are two main types of sensing methods, self-capacitance and mutual capacitance [see Figure 2], where each has its own advantages and disadvantages.

The evolution of P-Cap type of touchscreen is now defined as the standard for touch user experience :

- High Durability
- High Transmission
- Water Resistance
- High Resolution
- Input with glove possible
- Two points touch available
- EXC Projected Capacitive Sensor uses transparent electrode technology

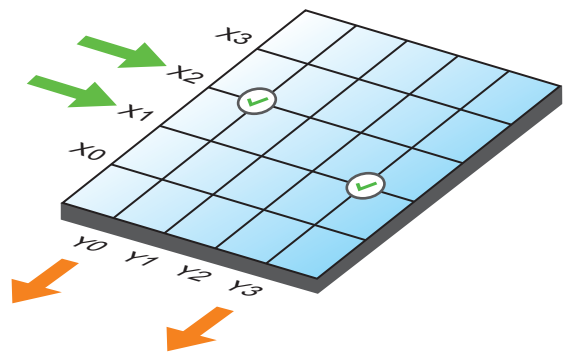


### Self Capacitance



Ghost Points

### Mutual Capacitance



P-Cap technology is an ideal solution for contaminant-prone, public access or harsh environments where dust and debris can collect on the surface of the touchscreen or along the bezel edge.

The P-Cap touch screen solutions offered by Getac are protected by glass to withstand harsh environments and for maximum light transmittance.

## Getac LumiBond® 2.0 features

Getac introduces a series of industrial touchscreens based on the P-Cap technology. The Getac LumiBond® 2.0 uses the P-Cap touchscreen to provide a thinner and lighter product design and achieve better performance in bright light and in harsh environments.



### Gorning Gorilla Glass :

Utilizing Corning® Gorilla® Glass on the outermost layer of our LumiBond® 2.0 technology helps make for one of the toughest displays available.

### Optical Clear Resin :

A remarkable new resin makes it possible to bond the outer glass, touch panel and LCD creating a single, more durable panel for better visibility.

### Capacitive Touchscreen :

A special multi-layered multi-touch sensor registers pressure, meaning you can use it with bare hands, hands with gloves, stylus or digitizer.

### Optical Clear Resin :

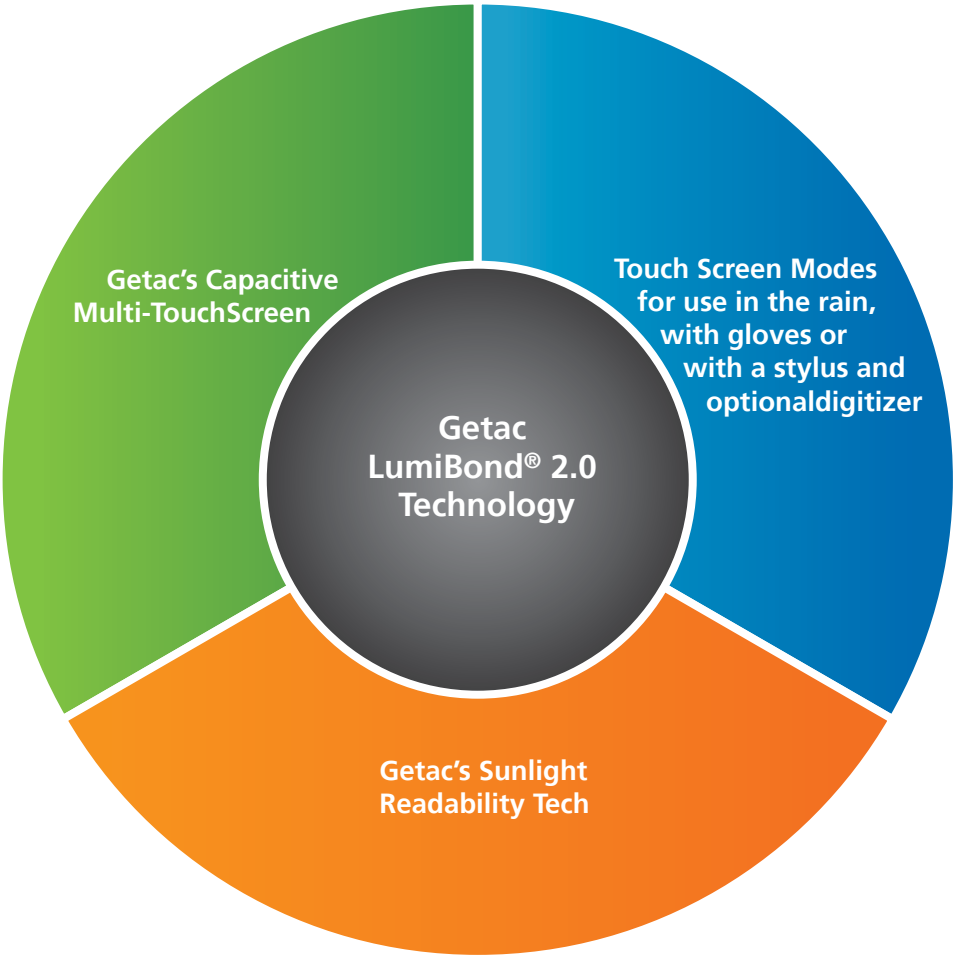
A remarkable new resin makes it possible to bond the outer glass, touch panel and LCD creating a single, more durable panel for better visibility.

### TFT/OLED LCM :

LumiBond® 2.0's special liquid crystal display is incredibly energy efficient while also being bright and easy to read in all environments.



Getac devices which utilize our revolutionary LumiBond® 2.0 technology with enhanced touch function (Touch/Rain, Glove or Pen mode, plus an optional Digitizer mode) achieve a display that is more readable, and offers better contrast and more crisp colors than any other rugged tablet display. By bonding the display glass with the touch panel and LCD, we've created a single pane that is both more durable and improves readability.



Getac's LumiBond® 2.0 technology integrates Gorilla® Glass, capacitive touch sensor, LED panel and three touch screen modes, providing unprecedented touch sensitivity in extreme environments.

**The LumiBond® 2.0 technology consists of the following features :**

**Getac Sunlight readability technology :**

increasing screen brightness with a brighter CCFLs fluorescent backlight consumes dramatically more power, cutting battery life and increasing weight of the mobile devices. Getac LumiBond® 2.0 provides better user experience under strong sunlight— due to its high light transmittance, the devices are able to read under strong direct sunlight. This is a technology that makes the LCD display more readable in outdoor environments.

**Getac capacitive multi-touch screen :**

■ **High color saturation for brighter screen :**

Getac LumiBond® 2.0 technology provides better color saturation which presents more accurate color to the users.

■ **Durable and scratch-resistant surface :**

the surface of Getac devices with LumiBond® 2.0 can withstand unexpected scratches.

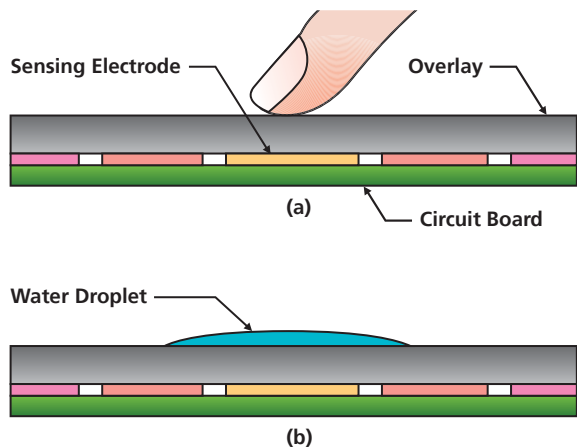
■ **Tempered glass :**

boasts the latest Corning® Gorilla® Glass which provides exceptional damage resistance against the scratches and bumps of everyday use.

**Touch screen modes for use in the rain, with gloves or with a stylus and digitizer :**

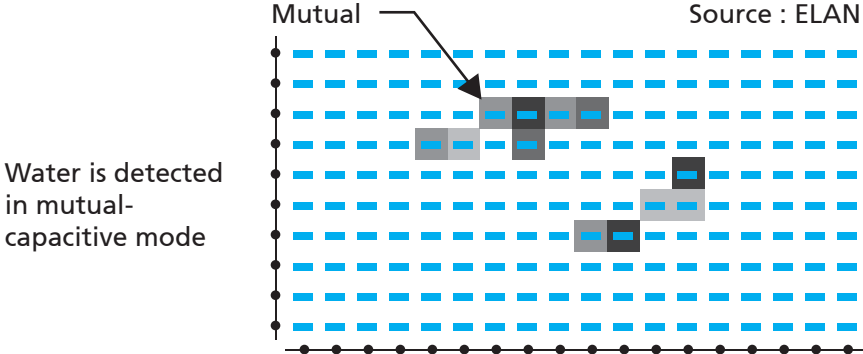
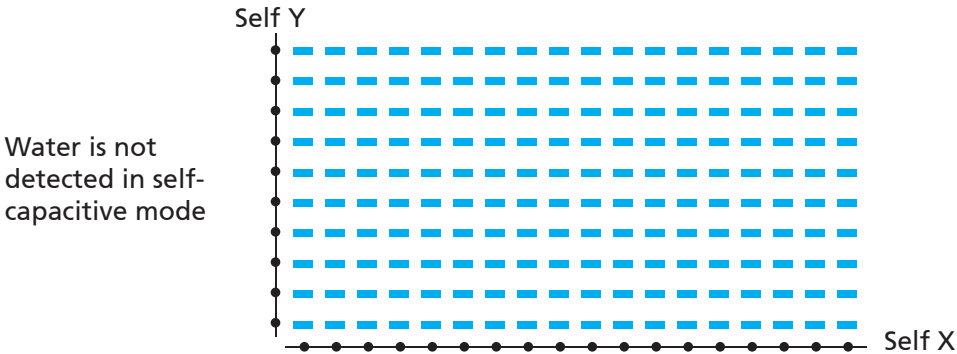
- **Glove touch :** Gloves insulate the body capacitance from the sensor used in capacitive touch. The thicker the glove, the more difficult the technical challenge. Glove touch requires a high sensitivity capacitive touch panel. The controller IC must be capable of switching back to low sensitivity for normal operation with fingers or a pen. Background noise complicates the technical challenge. Shielding may be required to prevent false readings.

- **Water detection for use in the rain :** the ability of rugged devices to be operated reliably in wet environments is important. Fingers are conductive, so they interact with the electric field that is set up around the touch sensors. Water is also conductive, so it interacts with the same electric field when it lands in the active sensing area. This can lead to a report of a finger touch when water splashes onto the sensing surface, even when no finger is present.





Getac LumiBond® 2.0's waterproof design provides system performance that is totally immune to the effects of water. In a water tolerant design, water levels encountered in normal operation do not interfere with sensor operation. Splatters and spills on the touch surface are not identified as touch.



Through combining the characteristics of self-capacitive and mutual-capacitive sensing, the devices featuring LumiBond® 2.0 technology can be used under rain (see water detection example below). In addition, the users can employ a stylus or digitizer for more accurate operation.



**Benefit of Getac LumiBond® 2.0**

- High color saturation technology
- Capacitive multi-touch screen sensitivity even in the wet environment and with gloves
- High effective contrast ratio due to LumiBond 2.0 technology
- 2 layers of resin (glue) inserted to prevent condensation between the LCD panel and touch screen.





## Getac Core strength

Getac designs and manufactures rugged solutions to meet demanding requirements. We continue to innovate, improving the industry's leading products to meet customers' needs. The LumiBond® 2.0 is one of the technologies we envisioned and created to provide a reliable and better user experience.

### Product innovation

Thinner and lighter: we keep innovating thinner and lighter rugged products and designing several types of cosmetic coating onto the touch panel surface, such as anti-glare, anti-reflection, anti-smash, etc., for higher performance in demanding environments.

Multi-touch mode: Touch/Rain, Glove or Pen mode plus an optional Digitizer mode that allows users to utilize the device's various applications in the field.

### Customer oriented

Built for today's mobile workforce, Getac provides users with touchscreen solutions meeting a wide range of needs and uses even with gloves or in the rain.

### Advanced facility and equipment

Getac has focused on the industrial market for more than 25 years. To meet the stringent product testing procedures, we keep investing on the most advanced facilities and equipment which help to ensure high product quality that our customer can rely on.

### More than a manufacturer. Design and technology service provider

Getac rugged notebooks are manufactured in-house down to the chassis. Our products are being used in the most challenging conditions around the world. We don't simply make an ordinary computer rugged, we engineer and design Getac computers from the ground up to be rugged inside and out.



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