

**Technical Paper: Very Large Narrow Bandpass Filters**  
*New Facility for Manufacturing & Testing*



600 mm lens after coating

and planned telescopes with

Optical coatings are key elements of any optical system. They can reduce surface reflection loss, isolate spectral bands, re-direct the light path and split light beams by wavelength. For decades, astronomers have made use of these special characteristics embodied in Anti-Reflection (AR) coatings, Band Pass (BP) filters, mirrors and Dichroic Beamsplitters (DBS). In the last several years, a need has arisen for much larger high performance filters and coatings than previously required. This is being driven by the ever increasing size of new their correspondingly larger focal planes.

To respond to the astronomy community's requirement for very large narrow bandpass filters, Materion has developed a low risk path that consists of scaling a proven deposition process and associated controls to a corresponding size. To support the technology, we designed a facility with specific performance targets consistent with narrow bandpass filters but in much greater sizes than previously produced. The results of this work have for the most part exceeded our target performance goals. Read a [technical paper detailing the large narrow bandpass filter capability and the new Materion facility...](#)

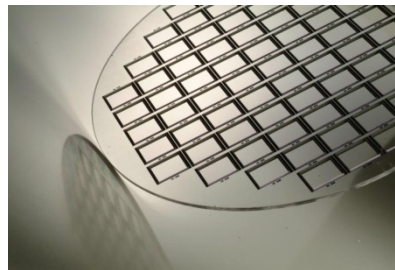
**IR Detection and Sensing**

*Impact of WLP Technology on the Market*

Infrared (IR) detection is poised for high growth over the coming years largely powered by the technology advances in wafer level packaging (WLP). These new MEMS-based platforms and the applications they serve are acting as catalysts to expand the market and help reduce costs.

**Wafer Level Packaging Streamlines Production**

The advantage of wafer-level packaging is that it uses the same manufacturing process as that for a computer chip, but simplifies the process. In the traditional manufacturing model, the IR sensors would be assembled one unit at a time, which could include over 10 parts. The new streamlined WLP process can produce hundreds or even thousands of sensors per



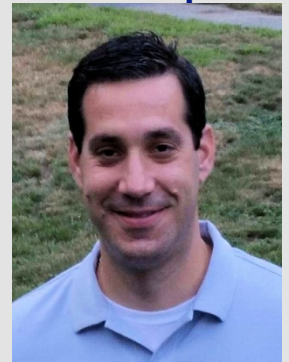
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**Meet Materion:  
Bill Christopoulos**



Meet Bill Christopoulos, Director of Commercial Business at Materion Barr Precision Optics & Thin Film Coatings. Bill is responsible for implementing the company's vision for growth in the commercial market. With his strong background in engineering, he is routinely involved with technological development and design, as well as operations and quality

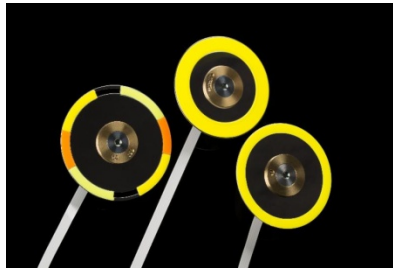
wafer depending on the configuration - and consists of assembling just two parts.

With WLP technology and its mass production, the cost per individual unit will continue to decrease. With the price of commercial goods dropping, consumers will be able to afford products once thought too expensive. Markets with the greatest potential to multiply under heightened consumer interest include thermal imaging, non-contact temperature measurement, motion sensing, surveillance and gas detection. As one of the projected growth industries, thermal imaging is gaining in popularity for a variety of applications. [Read more about WLP impact...](#)

## Evolution in Projection

### *Technology Trends in the Projection Display Market*

The lamp illuminated projector has dominated the projector market for many years. However, more recently manufacturers have introduced advanced laser projectors and LED hybrid illuminated projectors. These projectors are playing an increasingly important role in the overall display market.



Compared to the older lamp illumination technology, laser and LED illumination is more efficient, has a longer lifetime, delivers improved color performance, and provides a lower lifetime cost-of-ownership. In addition to these advantages, laser and hybrid LED illumination projectors are environment-friendly, which is now a key requirement for most countries.

Many commercial markets, such as television and high-end entertainment lighting, are now switching to laser or hybrid illumination due to its many benefits. Some new laser illumination projection TVs have been launched that deliver a much better consumer viewing experience on a large screen. They are able to project with greater light sensitivity for an improved picture and at a reduced cost compared to comparably-sized OLED TVs. [Read more about laser and hybrid systems...](#)

## More Than Just Optical Thin Films!

### *Materion's Engineered Film Offerings*



While you may be familiar with Materion's optical filters and coatings, you may be unaware that our expertise extends to non-optical thin films as well. This is a unique capability, not found at most optical coating companies. Drawing on over 35 years of thin film deposition experience, we are able to provide custom, patterned or non-patterned, metallic and non-metallic thin film stacks for a variety of applications. We serve a variety of markets and industries, including defense, medical and consumer electronics.

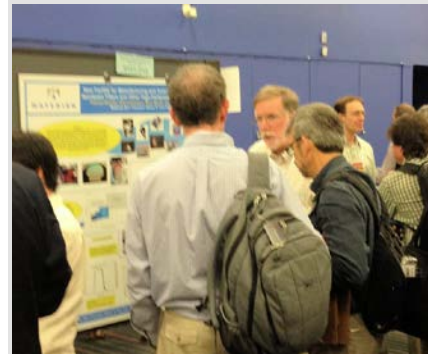
assurance.

As to his role at Materion, Bill commented: "It gives me great satisfaction working with customers directly. It is amazing to speak with them and hear how our products have added value to so many of their applications."

Bill reports directly to President Robert Naranjo and has been with Materion for fourteen years.

In that time, he has worked extensively in the SWIR, MWIR and LWIR markets and was instrumental in bringing thermal imaging applications to Materion. One of his major projects has been the ongoing Wafer Level Packaging (WLP) program. [Read more...](#)

## SPIE 2014: Materion Poster Presentation



Tom Mooney, Materion Product Engineering Manager, presented his [poster on 'large optics'](#) at the SPIE Astronomical Telescopes + Instrumentation session in Montreal in June. It was titled "[New Facility for Manufacturing and Testing Very Large Narrow Bandpass Filters & Other High Performance Optical Coatings.](#)" In addition to the poster, Tom and fellow Materion employees Walter Pawlewicz, Mike Merrill, Dave Leclerc and Kerry Hurd co-authored a technical paper of

## Precious Metal Advantage

As one of Materion Corporation's diverse businesses, we have access to the Advanced Materials Group's supply chain of precious metal sputtering targets and evaporation materials. They are one of the world's largest manufacturers of these "high value" products. This provides us with an uncommon opportunity that no other company can touch. While others have to purchase these precious metal materials from outside vendors, we can formulate special compositions and source these materials in-house at significantly less cost to our customers. Read [more...](#)

the same name. Materion also hosted a one-night catered reception during the conference to provide an opportunity for attendees to chat with those in the industry and catch a preview of Tom's poster presentation.

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