

May 2013

## Large Area Coater Up and Running!

Materion's state-of-the-art Large Optics Coating Facility in Westford, MA is now up and running. The completion of this 18 month project significantly enhances our capability to manufacture and test extremely large optical interference filters and other complex optical coatings. The centerpiece is our large vacuum coating chamber which can coat large optics up to 1.4 meters (55 inch) diameter. While other firms may be able to coat optics this size and larger, we add greater value by producing highly complex coatings with exquisitely good uniformity over a large area. Essentially, we scale the same process used for an eight inch part to produce similar quality results for larger parts.



Coating fixture on the handling equipment.

The coating facility includes not only the vacuum chamber, but a precision wash station to clean large optical substrates, spectral measurement instruments, and special handling equipment all housed in a clean room with measured particle counts placing it at ISO 4 (class 1000) or better. All equipment has been custom-designed for this application and has the capability to allow safe handling of large and expensive optics, with precise deposition and testing of complex interference filters consisting of a few to well over 100 layers on substrates as large as 1.4 meters diameter.

Product-wise, Materion is targeting high performance bandpass filters up to 750 mm diameter which can easily require well over 100 thin film layers of precise thickness. We are uniquely positioned to produce these filters in much larger sizes than are currently available. Additional product capabilities include beam splitters up to a meter in size, with layer counts in the 50 to 80 range, as well as enhanced mirrors up to 1.4 meters. [Read more about Materion's Large Area Coater...](#)

### In This Issue

[New Wafer Level Coating Cell](#)  
[High Value Coatings](#)  
[Major Issues Gas Detection](#)  
[Next Generation LumiWheel](#)  
[New Wafer Level Coating Cell](#)



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### IN THE NEWS! Space, Science & Astronomy



Final integration with launch vehicle. PROBA-V Sits Atop VESPA adapter. (Photo: European Space Agency)

**SATELLITE LAUNCHES  
CARRY SPECIALIZED  
MATERION OPTICS**

These have been several

## New Director of Materion Global Sales



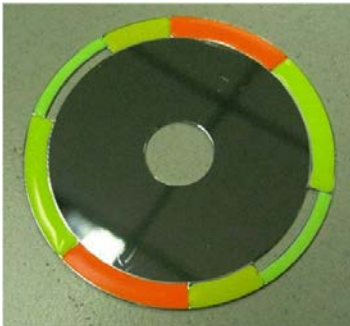
Stuart Lawson, Director of Global Sales

Materion Barr Precision Optics & Thin Film Coatings is pleased to announce that Stuart Lawson has been promoted to the newly created position of Director of Global Sales. In his new role, Stuart will be responsible for establishing a new Global Sales Organization encompassing the US, Asia and Europe. Stuart previously held the position of European Sales Manager.

Stuart was educated at St. Andrews University, Scotland, and holds a Masters Degree in Laser Physics and Optoelectronic Engineering and has over 14 years of experience in the optical thin film component business. His background and expertise complement Materion's core technology and heritage as one of the world's largest manufacturers of precision thin film coatings and optical filters.

Stuart will be focusing on unifying Materion's various sales resources and increasing its market presence around the globe, with the goal of bringing a new level of service and interaction to its customers.

## New Generation LumiWheel™ Enhances Performance



As part of the solution to your total light management challenge, Materion introduces our second generation LumiWheel™ designed to strengthen the color and quality performance of the latest model laser projectors. Our new design consists of an enhanced multiple color phosphor wheel with added Cyan phosphor that raises efficiency as much as 20%. This version improves the blue color image quality to a comfortable visual

tone by converting blue laser to cyan light mixed with blue laser light.

The LumiWheel™ is used for color splitting in field sequential light management for digital projection, video production, and photo imaging. As a Materion product containing innovative components, it will be particularly suited for new generation projector applications such as laser or hybrid illumination. With its upgraded construction, the LumiWheel™ provides a stable high speed rotating wheel that converts blue laser light to multiple visual wavelength light. It also improves yellow and red color phosphor efficiency which further contributes to the overall projection brightness.

[Read more about LumiWheel™...](#)

satellite launches recently that include a Materion presence onboard. One is the Air Force SBIRS GEO-2 recon satellite on an Atlas V vehicle from Cape Canaveral AFS, Florida whose payload carries highly specialized infra red coated optics provided by the Materion High Value Coating team in Westford, MA. In addition, the filter array group provided filters for two other missions launched on a VEGA vehicle from Kourou, French Guiana. These were PROBA-V, a Belgian /ESA satellite, and the VNREDSat-1A, a Vietnamese mission - both with Materion multispectral filter arrays.



Hubble Wide Field Camera 3 at Goddard Space Flight Center. (Photo: NASA)

### HUBBLE CONFIRMS FURTHEST SUPERNOVA

As reported by the European Space Agency (ESA), Hubble Space Technology scientists have set another milestone by confirming the discovery of the furthest supernova. This one was thought to have exploded more than 10 billion years ago, whereas the previous record was 9 billion years ago. The

## Major Issues for Gas Detector Manufacturers

Materion has been manufacturing high performance gas detection filters for the last three decades. Customers predominantly use thermopiles, pyroelectric, and lead selenide detectors to detect carbon dioxide, methane, and many more gases. These filters usually range from 1 $\mu$ m up to 11 $\mu$ m with the most common filter being around 4.3 $\mu$ m for carbon dioxide detection. These filters can be applied to many different substrate types but generally the customer will utilize silicon, sapphire, or germanium. Signal-to-noise ratio, filter shift with temperature and angle, and repeatability are three major issues that detector manufacturers face daily. Materion creates custom solutions based on the needs of each detector manufacture in order to ensure that these risks are mitigated.



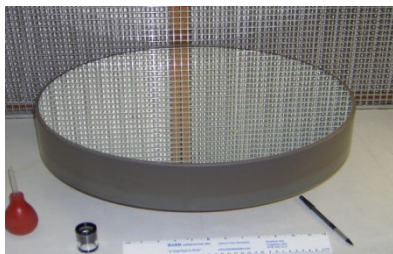
project, called the Ultra-Deep Survey, was conducted by an international team of scientists. It was enabled by the Wide Field Camera 3 containing Materion bandpass filters. The effort represents a collaboration between Hubble and the ground-based European Southern Observatory (ESO) Very Large Telescope which also employs Materion filters.

One of the most critical issues that detector manufacturers deal with is differentiating between signal and noise. This is a major function of the optical filter. If the filter does not block out noise and transmit the signal properly to the detector then the detector may send a false detection signal to the system or not detect the signal at all. Materion designs the filter to ensure that the detector will have a high signal-to-noise ratio. Materion creates thin film coating designs with at least three cavities in order to create the optimal filter shape while keeping cost down for high volume manufacturing. [Read more about gas detection issues...](#)

## Meet Materion: Tom Mooney



## High Value Coatings - Materion as Technology Leader



*Enhanced AG Coating on 21".110 lb substrate.*

Materion's BARR Precision Optics & Thin Film Coatings is committed to being a leader in superior coating technology and providing our customers with a broad range of innovative solutions for their coating needs. Our proprietary, cutting edge deposition processes produce high yields and minimize risk to expensive optics. An excellent example of our dedication to being our Customers' First

Choice is our high value coatings ("HVC") services offered by our Westford, MA facility. At this location, our skilled HVC team coats custom optics that have a "high value" to our customers. In determining "value," the cost of the substrate material, the optic's geometric complexity, the man-hours invested in substrate characterization and other factors are taken into consideration. Under "high value" circumstances, it is preferred by Materion to take a more cautious approach to ensure optimal coating, rather than use common

For almost 35 years, Thomas Mooney has been interacting with scientists, astronomers and engineers from national space agencies, major astronomical observatories and universities. As Product Engineering Manager, Space and Astronomy, for Materion (formerly Barr Associates) in Westford, MA, these long-term relationships have allowed him to relate to customer needs on a personal level. In his current position, Tom reports to Kevin Downing, Director of Defense & Space, Science & Astronomy

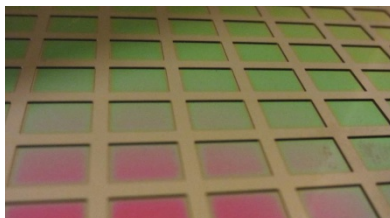
practices employed by high volume manufacturing vendors.

With our emphasis on quality performance coatings that deliver ultimate spectral performance, it is not surprising that Materion has been heavily involved in providing HVC services to the Defense & Space markets, and has earned a strong base of repeat customers, as well as a strong industry reputation, through years of manufacturing excellence. We have coated optics for high visibility programs with technically complex applications that rely on thin film technology to protect sensitive optical elements in: laser systems, surveillance/ reconnaissance, FLIR systems, lasercom, space-based imaging and reflective astronomy.

[Read more about high value coatings...](#)

## New Multi-Million Dollar Wafer Level Coating Cell

Materion Barr Precision Optics & Thin Film Coatings is pleased to announce the current construction of a 3,000 square foot class 1000 clean room outfitted with the market's latest infrared coating chambers and 3D patterning equipment. The work cell will significantly enhance our capability to manufacture low defect coatings in high volume for the infrared wafer level, defense and consumer electronics markets.



Wafer Level Packaging

The Wafer Level Coating Cell, located at Materion's facility in Westford, MA, is uniquely designed to be self-contained with a semi-conductor manufacturing layout to handle 200mm wafers. The multi-million dollar investment will assist in decreasing the cost of uncooled micro bolometer detectors and ultimately facilitate major growth throughout the commercial infrared camera industry. The new Wafer Level Coating Cell meets current market demand requirements as well as being in the forefront of future market needs. It also enhances competencies across many other technologies in which we have competitive differentiation, such as gesture control filters, arrays, gas sensing filters, and others. [Read more about the new Wafer Level Coating Cell.](#)



As of March 1, 2013, the EIS Optics facility in Shanghai, China has officially changed its name to Materion Precision Optics Shanghai Limited. EIS

Business.

On a typical day, Tom's work may range from: developing a proposal for a filter set for the next European Space Agency science mission; responding to technical questions from a scientist at NASA; discussing optional approaches to a filter problem from an engineer at a Japanese observatory; or guiding a Materion technology development. His current focus is on highlighting services for Materion's new Large Optics coater. As part of his job, it is critical that Tom stays abreast of technology both at Materion and in the space and astronomy community. "In this market, it is very important to understand the customer's technical requirements and the context of Materion filters and coatings within the customer's system. Each of their space missions can represent a scientist's life work." In the space field, Tom has some interesting work reminiscences. [Read more about Tom Mooney...](#)

## Materion Presents at SVC Conference on Astronomical Filters

Robert Sprague, Director of Technology, gave a presentation at the April 2013 *Society of Vacuum Coaters Annual Technical Conference*

in Providence, RI. The topic was the "Evolution of Filters

Optics, formerly known as Oerlikon, was acquired by Materion in October of 2010 and operates as part of Materion Barr Precision Optics and Thin Film Coatings. Legal use of the Materion name completes the transition and integration of this world class business and further strengthens the Materion Brand as an industry leader.

for Astronomical Applications."  
[Click to view PPT.](#)

The Shanghai facility is a modern 97,000 manufacturing facility with state-of-the-art clean rooms with vacuum deposition or sputter systems and adjacent processes. It specializes in high volume, precision optical thin film coatings, glass processing, lithography and opto-mechanical assemblies for a broad range of end-use applications in projection display, entertainment lighting, sensors, medical instruments and gesture control.

EIS Optics and its predecessor companies represent more than 60 years of experience in the industry and complement Materion's existing leadership position in thin film optical filters that enable complex technologies throughout the defense, aerospace, medical, semiconductor, Thermal Imaging, gas sensing and astronomy markets. Our goal is to offer unparalleled value and make Materion our customer's First Choice.

<b>MATERION BARR PRECISION OPTICS &amp; THIN FILM COATINGS</b> 2 Lyberty Way Westford, MA 01886 Phone: +1 978.692.7513 <a href="http://www.materion.com/barroptics">www.materion.com/barroptics</a>	USA: +1 978.692.7513  Asia: +86 21 5057 4646
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Materion | 2 Lyberty Way | Westford | MA | 01886