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"In the middle of difficulty lies opportunity"  
– Albert Einstein

## Influenza A

### H1N1 Preventive Measures

In **2003**, there was **SARS**, which caused 8,098\* people worldwide to be sick and resulted in 774 fatalities.

In **2009**, **Influenza A**, or more commonly known as H1N1 or the Swine Flu, is once again sweeping the international community off their feet, but this time, with greater speed and audacity. 116 countries have reported 81,972\* cases thus far, including 359 fatal cases, and the numbers are still crawling. As of 30th June 09, Singapore has confirmed a total of 629 H1N1 infection cases.

Beginning April 2009, this novel flu virus of swine origin is thought to spread in the same way as regular seasonal influenza viruses, mainly through coughs and sneezes of people who are sick with the virus. As this is a new virus and a vaccine has yet to be developed, most people will not have immunity to it and the resulting impact are predicted to be more severe and widespread.

In times like this, it is exceptionally important that we take care of our health and step up on our hygiene to minimise the chances of being infected and curtail the spread of the virus. Symptoms of **Influenza A** include fever, sore throat, muscle pains, severe headache and coughing which are similar to those of normal flu.

Apart from face masks and hand sanitizers, many government organizations and companies have already adopted infrared thermal camera for mass fever screening. Once an elevated body temperature is detected, the individual will be singled out for a more accurate body temperature taking and be asked to rest at home or visit a doctor to prevent any potential spread of the flu.

As the premier distributor in the region, Zugo Photonics has been the reliable provider of Infrared Thermal Cameras to high risk groups like hospitals and government agencies and also, the proud sponsor for the fever screening at the recent People's Association Narpani Seminar.

The seminar was graced by Senior Minister of State for Foreign Affairs **Dr Balaji Sadasivan** and attended by 1,500 members of the Narpani Pearavai and grassroots leaders from the various GROs and CDCs. The screening allows the organizers and participants to have a peace of mind as they immerse themselves in the seminar.

\* Statistics from the World Health Organisation.

# Corporate News

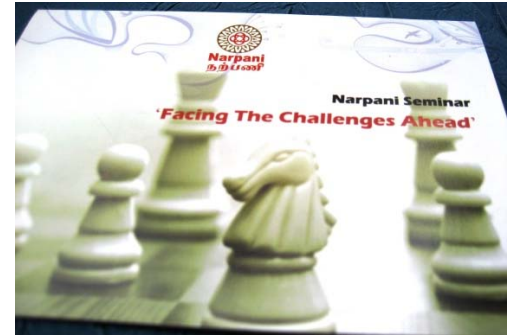
UPDATES



## Narpani Seminar – *Facing the Challenges Ahead*

**24th May 2009** - Organised by PA IAECs Council, the Narpani Seminar had brought together 1,500 members and grassroots leaders from community development councils (CDCs) and grassroots organisations (GROs) for a welcoming and promising seminar in Raffles City Convention Centre.

With its beginnings in 1977 as an Indian Culture Group in Kallang Community Centre, Narpani Pearavai has since, served as the catalyst for IAECs to organize educational, cultural, social and sports activities to promote harmonious relations between Indians and other communities and also, enable Indian Singaporeans to contribute positively as active citizens.



The topics covered aimed to educate and equip the grassroots leaders with the necessary knowledge and skills to work well with other GROs to promote social cohesion and racial harmony within their neighbourhoods as well as increase the audiences' awareness of the various social assistance schemes available in Singapore in order to help the lower income and other disadvantaged groups in need.

Fever screening was done using **Infratec's VarioCam Basic** as the attendees passed the infrared thermal camera monitored by Zugo's engineers. This is a precautionary measure adopted by the organizers to minimize the participants' risk of contracting the prevalent H1N1 virus in a public arena.

**Zugo Photonics** is very pleased to be able to help out in the event and we will like to congratulate the organizers on the success of the seminar.



▲ Fever screening conducted as participants enter the reception area.

▼ Dr Balaji Sadasivan looking at the IR images of the passing participants.



▶ Dr Balaji Sadasivan engaging in a light-hearted chat with Zugo's director, Mr Kelvin Ng.



### 26 June

### RSoft End User Meeting

Nanyang Technological University  
S2.2-B2-53, South Spine  
Executive Seminar Room, 9am – 1pm

Interested in learning more about the leading design software in the industry for your components, systems and network design?

**Join us** at the upcoming RSoft End User meeting to find out more about the capabilities of the latest softwares like *Solar Cell Utility*, *LaserMOD* and *MOST*.

You can also learn from the first hand experiences of other RSoft users as they share their application stories and areas of research that they are currently embarking in.

### Gentec-EO

### 13 April

### "Power Kit" Promotion!



gentec-EO

Gentec-EO is extending a very attractive offer to existing LaserPower/Energy detector and monitor users!

Enjoy a **25% off** all new Gentec-EO kits when you trade in your old detectors and monitors **OR** receive a **Free Calibration** when you purchase a new kit. Each kit comprises a set of detector and monitor.

### ICMAT 2009

*International Conference on Materials for Advanced Technologies*  
Suntec Singapore Convention & Exhibition Centre

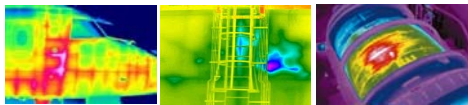
**ICMAT 2009** is a multidisciplinary forum providing over 2000 research scientists and engineers a first-hand learning platform, as well as the opportunity to share and exchange ideas with some of the best minds in the field. There will be 23 Symposia covering contemporary topics of importance for the science, engineering and technology of materials, and the technical program includes Plenary, Keynote, Invited, Oral and Poster presentations.

**Zugo Photonics** is taking part in this event and we will be showcasing our range of **RSoft Design Simulation Software**, **MinusK Vibration Isolation Platform** and **Andor EMCCD Camera**.

Please join us for the event at **Booth B6, Suntec Gallery, Level 3.**

### 29 June – 1 July

### 24 - 28 August



### Infraspection 2009

*Infraspection Institute Level 1 Certification Course*

Following the success of Infraspection 2008, **Zugo Photonics** is once again proud to present to you **Infraspection 2009**. This 5-day intensive course is geared towards the new IR(infrared) camera user and focuses on its use for a variety of monitoring and predictive maintenance applications.

Upon completion of all training course requirements and a thermography field assignment, the participant will receive a **Level I Infrared Thermography Certification**. This respected course is accredited by the Professional Engineers Board (PEB), Singapore.

For more information on the course and registration details, please contact:

Ms Tan Hui Hua, Executive, Strategic Marketing  
Email : [huihua.tan@zugophotonics.com](mailto:huihua.tan@zugophotonics.com)

#### Course Outline

Learn to collect quality data, accurate temperature readings, and account for measurement effects such as distance and emissivity using infrared cameras. Avoid costly mistakes - learn to distinguish between hot spots and reflections, direct vs. indirect readings and qualitative vs. quantitative thermography.

**Registration Opens Now!**

## Quick Bytes

Zugo's Strategic Marketing Director, Mr Oh Kim Eng, was invited to the recent **NTU-MAE Engineering and Innovation and Design Programme** as one of the panel of judges. A NTU alumnus, Mr Oh has taken up various key roles in the engineering industry and his vast experience and industrial knowledge have served him well in accessing the quality of the students' work.

Apart from paying tribute to his alma mater, Mr Oh also shared his vast experiences with the students as he went through the groups' projects and provided pointers to the areas that needed improvements.

Being the leader of its field, Zugo Photonics has stayed committed to providing its customers with value added services by keeping ourselves abreast of the latest technological advances as well as developments on our users' end.



The **Engineering Innovation and Design Programme (EID)** is an integral part of the second-year MAE curriculum. The programme enables students to experience some of the practical learning in preparation for an engineering or technopreneur career in the new Knowledge Based Economy.

This programme encourages students to propose team-based projects, plan and develop the team ideas under the guidance of mentors and as such excites the imagination of aspiring engineers, innovators and technopreneurs.

◀ Mr Oh (second from right) with the first runner up of the Design and Innovation category.

### Zugo Mailbox



Dear Readers,

Here are some Q&As that we have gathered to-date. You are welcome to provide your comments and feedbacks as well as pose any enquiries of yours and we will do our best to provide the answers in the next issue of **UPDATES**.

#### **Q: What is a “Replicated Mirror” and what are its advantages?”**

**A:** Replication is a transfer process that “replicates” the optical characteristics of a precision master onto a machined part (substrate). Replication **minimizes system cost, reduces weight** of the final component and significantly **simplifies system design** by eliminating glass mirrors and secondary mirror mounts and **places the mirror surface directly onto the metal mount**.

#### **Q: What is Birefringence?**

**A:** It is the splitting of a light beam into two perpendicular polarization components, which travel at different velocities through a material. There are 2 types of birefringence

##### ■ **Intrinsic birefringence**

- Difference in refractive indices in crystals and polymers

##### ■ **Residual birefringence**

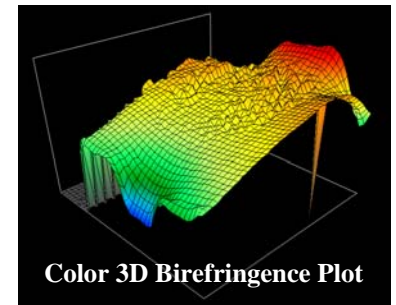
- Inhomogeneity of refractive index from residual strain formed during production

## Hinds' Exicor Birefringence Measurement Systems



**Exicor Birefringence Measurement** technology provides leading edge companies with the world's most technically advanced, production-worthy measurement capability.

**Exicor** is the metrology standard for measurement of both magnitude and angle of linear birefringence. It features easy-to-integrate data acquisition software, an advanced statistical analysis module, and modular designs for OEMs.



### Exicor 150AT

- Used primarily for lower weight optics measuring less than 150mm.
- Unprecedented sensitivity in low-level birefringence measurement
- Simultaneous measurement of birefringence magnitude and angle
- High-speed measurement
- No moving parts in the optical system
- Photoelastic modulator technology
- Excellent repeatability
- PEM Technology used in both ¼ Wave and ½ Wave **Exicor** systems removes the signal intensity dependence of typical measurements systems



▲ **Hinds' Exicor 150AT Low Level Birefringence Measurement System**

### Applications include:

- Quality control metrology
- Qualification of semiconductors photolithography components including
  - Calcium fluoride
  - Fused silica
  - Stepper reticles
- Low level birefringence measurement of
  - Flat Panel Display Glass
  - Plastic Film
  - Plate Glass
  - Glass and plastic lenses
  - LCD
  - DVD
  - Laser Crystals

## InfraTec VarioCam HR Basic



**VarioCAM hr basic** is a cost-effective entry level camera for convenient thermographic temperature measurements in a wide range of applications. It is equipped with uncooled Microbolometer FPA Detectors of the latest generation and the modular design allows for optimal adjustment of the camera configuration to suit special application needs.

The thermographic images are displayed in high quality in an adjustable, high-resolution colour viewfinder which simultaneously provides an overview of the current measuring conditions.

### Applications:

- Predictive Maintenance
- Condition Monitoring
- Leakage Localization
- Building Inspection
- Mass Fever Detection

▲ **InfraTec VarioCAM HR Basic**



## *What Newport did to make their optical filters better than most of the other filters in the market?*

### Laminated Products – Physical Separation

The principal cause for failure of all laminated optical assemblies is the failure of the bonding between assembled elements. Bondline failure initially appears as “feathering” at the point of moisture penetration as a result of uneven separation of the bonding material from the substrate creating color variation. Overtime, the process can continue to extend over the entire substrate area allowing the substrate to become detached from the rest of the assembly.

The process of physical separation can result from Process, Material and Environment factors like substrate cleaning, material chemical stability and prolonged exposure to solvents and water. At **Newport**, we have maintained continuous programs to develop new materials and processes to improve environmental durability and to establish statistically sound reliability profiles for manufactured products. These programs insure that customers are receiving the latest technology and accurate information regarding lifetime.

### Physical Deterioration – Hard Coatings

The majority of hard coatings are designed and manufactured to be resistant to damage from handling during assembly and use to withstand prolonged exposure to adverse environmental conditions. The absence of protection for these coatings creates conditions wherein coating failure usually occurs in a short period of time and is catastrophic in nature. Typical forms of failure include cracking, crazing, peeling and blistering of the coating.

All of **Newport’s** hard coatings are subjected to environmental reliability testing prior to shipment to insure that the products will achieve their designated lifetime. In addition, we maintain continuous process control data to insure that all hard coating processes remain within statistical control thereby significantly reducing the probability of catastrophic failure.

### Film Degradation – Moisture Induced

Majority of the evaporation chemicals employed in Soft Coating technology exhibit some susceptibility to decomposition from exposure to water. The degree of susceptibility varies widely from the high level found in silver to the low level of zinc sulphide. As moisture penetrates into the coating material, it begins to discolor, typically changing from a highly reflective to a cloudy appearance.

As physical deterioration of the film proceeds, the spectral performance will begin to degrade as well, albeit at a slower speed. Moisture induced film degradation usually results from 1 of 2 causes; either design constraints that restrict installation of a moisture barrier, or physical separation that allows moisture to reach a film which was previously protected by a moisture barrier.

At **Newport**, our soft-coated products are manufactured with scribed borders which provide the best seal against moisture penetration. In cases where scribed borders cannot be incorporated into design due to either size constraints or extreme integrated blocking requirements, we will design the product either using less moisture sensitive coatings or with an appropriate hard coating films, depending upon specified lifetime requirements and cost objectives.

### Epoxy Solarization

Certain epoxy resin systems exhibit relatively low resistance to degradation attributed to prolonged exposure to intense Ultraviolet (UV) energy. This type of degradation is often found on components manufactured using UV transmitting substrates, such as UV filters. Photochemical changes in these epoxies result in a reduction in the UV transmittance of the resin thereby causing a reduction of filter assembly transmittance.

**Newport** has developed designs to overcome this problem which include the use of improved stability, UV transmitting epoxies and the Argon-Gap construction method.

### Stabilife Technology

Stabilife optical filters and coatings are manufactured using two patented processes for the deposition of metal oxide thin film optical coatings; Reactive Ion Plating (RIP) and Hybrid Plasma Deposition (HPD). Both processes yield highly dense, thin film coatings with extraordinary hardness, abrasion resistance, and adhesion to the substrate.

## Negative-Stiffness Vibration Isolation

*“Negative-Stiffness Mechanism vibration isolation enables laser/optical instruments such as SPMs, micro-hardness testers and optical profilers to operate in severe vibration environment that would otherwise not be practical with other passive and electronic isolation systems” – Jim McMahon*

Laser and optical systems, whether used in an academic lab or in an industrial environment, are very susceptible to vibrations from the environment and these instruments almost always need vibration isolation. When measuring a few angstroms or nanometers of displacement, an absolutely stable surface has to be maintained upon which to rest the instrument and any vibration will cause vertical noise and fundamentally an inability to measure this kind of high resolution features.

Traditionally, large air tables have been the preferred system for laser and optical systems. Adequate up till a few years ago, these passive system air tables are now being seriously challenged by the need for more refined imaging requirements. Bench top air systems, however, provide limited isolation vertically and very little isolation horizontally. Application like Scanning Probe Microscopy, for example, requires extremely sensitive instruments that are unparalleled in the world. In order to achieve the lowest possible noise floor, on the order of an angstrom, vibration isolation must be used. Negative-Stiffness Mechanism (NSM) isolators have the flexibility of custom tailoring resonant frequencies vertically and horizontally, providing increased isolation performance for SPMs over air tables.

### Schematic of Negative-Stiffness Isolator

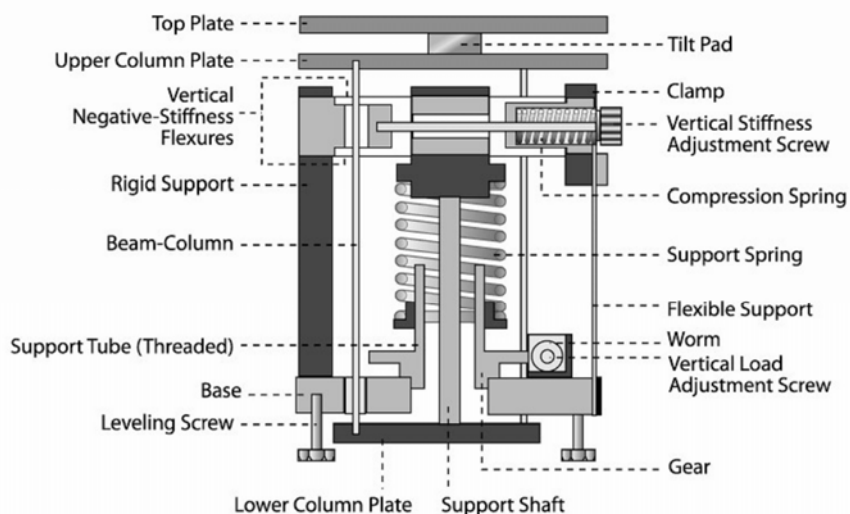


Fig 1 A vertical stiffness adjustment screw is used to regulate the compression force on the negative stiffness flexures. A vertical load adjustment screw raises or lowers the base of the support spring in response to varying weight loads to keep the flexures in their straight, unbent operating position.

Laser based interferometers are also extremely sensitive devices that are capable of resolving nanometer scale motions and features. They often have very long mechanical paths which makes them even more sensitive to vibrations. The sophisticated modern ellipsometry techniques that allow this high performance rely on low noise to be able to detect fringe movement. Properly isolating an interferometer will allow it to provide the highest possible resolution.

Interferometers and other optical systems such as optical profilers are often quite complex, and have long optical paths that can lead to angular magnifications of vibrations. Air tables can make the problems worse since they have a resonant frequency that often matches that of floor vibrations – typically 2 to 3 Hz. NSM isolators provide isolation in these environments when air tables simply cannot.

## Improved Transmissibility

What Negative-Stiffness isolators provide is really quite unique to the field of laser and optical systems, in particular, the improved transmissibility. Transmissibility is the vibrations that transmit through the isolator relative to the input vibrations. Transmissibility with Negative Stiffness is substantially improved over air systems, and even over active isolation systems.

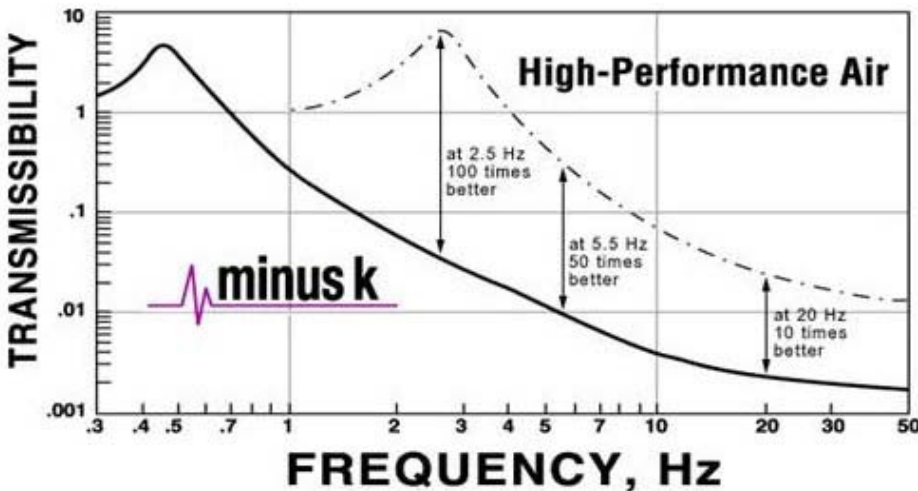


Fig 2 The transmissibility of a passive negative-stiffness vibration isolator – the vibration that transmits through the isolator as measured as a function of input vibrations – can be 10 to 100 times better than high performance air tables depending on the vibration frequency.

Also known as electronic force cancellation, active isolation uses electronics to sense the motion, and then adds forces electronically to effectively cancel out or prevent it. The efficiency of active isolation systems is adequate for applications with the latest lasers and optics as they can start isolating as low as 0.7Hz. But, because they run on electricity they can be negatively influenced by problems of electronics dysfunction and power modulation, which can interrupt scanning. Active systems also have a limited dynamic range – which is easy to exceed – causing the isolator to go into positive feedback and generating noise underneath the equipment. Although active systems have fundamentally no resonance, their transmissibility does not roll off as fast as NSM isolators.

Negative-Stiffness isolators employ a unique and completely mechanical concept in low-frequency vibration isolation. Vertical-motion isolation is provided by a stiff spring that supports a weight load, combined with an NSM. The net vertical stiffness is made very low without affecting the static load supporting capability of the spring. Beam-columns connected in series with the vertical-motion isolator provide horizontal-motion isolation. The horizontal stiffness of the beam-columns is reduced by the beam-column effect. The result is a compact passive isolator capable of very low vertical and horizontal natural frequencies and very high internal structural frequencies. The isolators (adjusted to ½ Hz) achieve 93% isolation efficiency at 2 Hz; 99% at 5 Hz; and 99.7% at 10 Hz.

As industry and universities continue to broaden their laser and optical research and applications necessitating more sensitive equipment and expanded lab facilities, vibration-handicapped environments will become more prevalent, and a better vibration isolation solution will be required than what has been available.

Negative-Stiffness Mechanism vibration isolation systems have become a growing choice for laser and optical applications. Not only is it a highly workable vibration solution, but its cost is significantly less – up to one-third the price compared to active and traditional passive systems – making it an economical solution to cost-conscious administrators.

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Low Power Lasers

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Low Power Lasers

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Gas

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