



Welcome to the Summer 2019 edition of 'Lens Innovation' – a periodic eNewsletter from **Resolve Optics Ltd.** Each issue of Lens Innovation is designed to keep you informed about the latest technological developments, applications advances and breaking news in the optical design and manufacture industry.

If a particular feature interests you do not hesitate to contact us or follow the link for further information. We welcome your feedback.



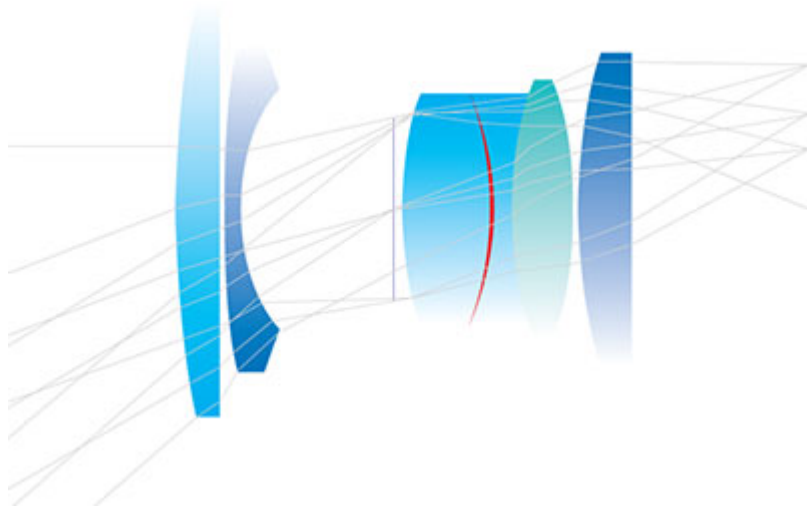
Mark Pontin
(Managing Director)

[Printable version \(pdf\)](#)

INFORMATION GUIDELINES:

The Importance of correctly specifying your lens systems

Lenses are arguably the most important part of your camera, sensor or optical instrument set-up, they make or break your image quality. They control the image that's projected onto your imaging sensor, and ultimately the quality of the results your camera, sensor or optical instrument produces.



Creating a specification for your optical system can be quite daunting and can sometimes lead to designs being over specified. Over specifying can add cost and you may end up with a lens system that outperforms the sensor in your product.

Each optical application has its key requirements, this can be resolution, distortion or aperture to name but a few. Often it is easier for engineers and scientists to state the key objectives of their application rather than actually specify the lens they require. For an Optical Designer there are basic pieces of information that they require to design a lens optimised to your application, these include:

1. Focal length or Object size and distance
2. Sensor format and sensor specification (pixel size)
3. Aperture
4. Spectral Waveband
5. Space envelope

With the above 5 bits of information, optical designers can produce a first design specification for your lens. Adding in further information about permissible distortion, vignetting and relative illumination allows us to fine tune the lens design. The process of lens specification becomes more complex as when you go from designing a single element lens to a multi element lens system.

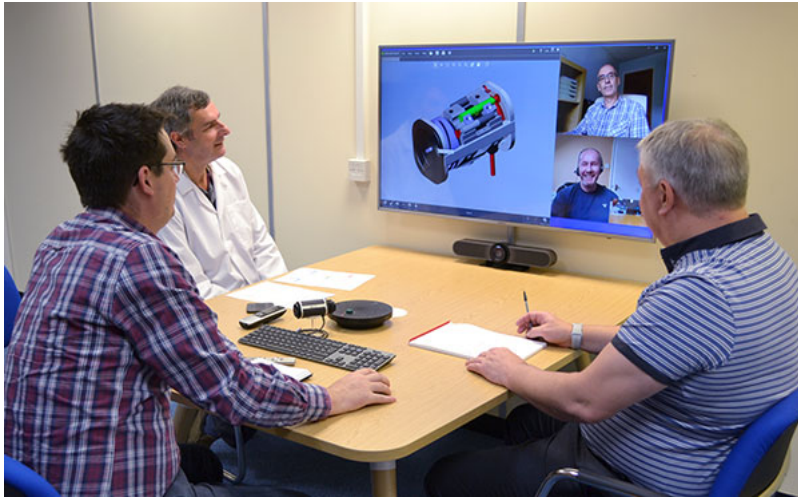
At Resolve Optics we feel a good understanding of the application is as important and, in some cases, more important than a lens specification. Having a good understanding of the application allows us to refine a specification to ensure you receive the exact lens you require. If required we can work with you to specify the optimum lens design for your application. At each stage of this process we fully involve our customers to ensure you fully understand the implications of the lens design choice in terms of performance, cost and ease of manufacture

To download our 2019 company brochure [click here](#).

To discuss an optimised lens design for your application please [click here](#).

VIEWPOINT:

Advantages of a Design Conception to Production Optics Supply Partner



When looking for a suitable lens for an optical application it is not uncommon for companies to spend considerable time searching through potential off the shelf lenses to try and find what is deemed to be a “Least Cost” option.

However, by their very nature, off-the-shelf optics are designed to provide a generic solution to a wide-ranging application to maximise the number that can be sold. As a consequence, for your specific application an off the shelf lens will at best provide a compromise in terms of performance, size and capabilities. Another consideration with using an off the shelf lens in your instrument, sensor or camera product is that you have limited control over how long before it is made obsolete by the supplier.

Over the last 20+ years Resolve Optics has developed the expertise and experience to be able to evaluate an application to determine and propose an optimised optical solution that delivers your product objectives. As optical designers and manufacturers we are though constrained by the laws of Physics! In these cases, we will always advise what is and isn't possible and explain why and then offer the best solution that is both cost effective and manufacturable.

To make the process of finding an optimised optical solution as easy and cost effective as possible is why we offer a complete start to finish service. Not only can we provide expert optical and mechanical design consultancy, but we can also manufacture and qualify prototypes as well as testing and supplying production quantities of your finished lenses and optical assemblies.

To safeguard your investment, once you have a lens that is designed and supplied by Resolve Optics, that lens will be available for as long as you require it. This provides you with guaranteed security of supply. Depending on the quantity you require per year you can also have design exclusivity, meaning nobody else can purchase your lens and you have secured that all important competitive edge that is not possible when selecting an 'off-the-shelf lens.

The perception of many engineers and scientists we meet is that custom designs are probably an expensive option. Yes, you may pay a little more initially but not as much as you may expect. Resolve Optics does not charge for a conversation. Most of the time we do not even charge for the cost of the design. We are more interested in a long-term partnership with our customers rather than a short-term gain.

To watch our OEM design and manufacture video: [click here](#)

Request a no-commitment SKYPE call to discuss your project: [click here](#).

TECHNOLOGY FORUM:

Working with SWIR Optics



Using lenses optimised for the Short Wave Infrared (SWIR) wavelength band (0.9 to 1.7 μm) offers unique advantages for a growing number of imaging applications that have been previously poorly served by general visible or infrared

optics.

SWIR differs from Mid Wave Infrared (MWIR) and Long Wave Infrared (LWIR) light. Whereas MWIR and LWIR light is emitted by an object, SWIR light is reflected or absorbed by an object and produces a high contrast image. When imaging at SWIR wavelengths, certain materials such as silicon are transparent. Colours that appear almost identical to the eye may be easily differentiated using SWIR. SWIR lenses are also used where visible wavelength detectors or cameras are not sensitive enough to provide the required finite detail recognition.

As a consequence, SWIR lenses are quietly earning a growing place in imaging applications including produce sorting, surveillance, quality control and inspection.

At Resolve Optics, over the last 10 year, we have developed a series of bespoke designed SWIR lenses for sensor, instrument and camera manufacturers looking to deliver the full advantages of SWIR technology with their products.

Recently we were asked to design and supply a Day/Night lens that covered the visible (400 -700 nm) and SWIR (0.9 – 1.4 μm) wavebands. The application was to provide a

view of the underside of a vertical take-off and landing aircraft enabling the flight crew to see if there were any obstruction such as holes or rocks in the landing area even in low light or foggy conditions.

It is our aim that all our specialist SWIR lens designs offer high-resolution operation at lower light levels as well as superior image quality, better transmission, and performance compared to general infrared and visible lens.

Learn more about SWIR optics: [click here](#)

DESIGN FOCUS:

Dating back over two decades – Resolve Optics has established an international reputation for designing and producing high performance endoscopes for a wide range of challenging applications.

So what can an Industrial Endoscope do for you?

An industrial endoscope is a precision instrument in which a series of relay lenses are used to transfer an image from one point to another. Used to



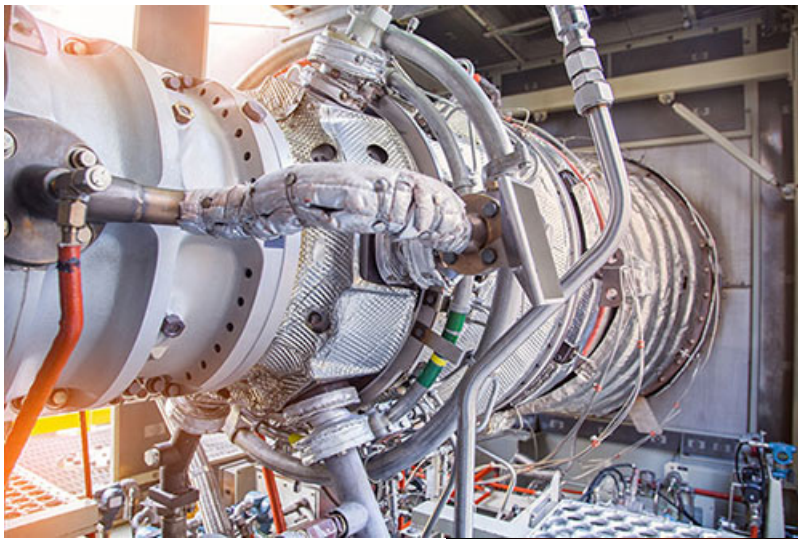
transfer an image to a sensor, camera or viewing eyepiece, industrial endoscopes typically range from 200 mm to over 4 metres long.

Originally designed for the medical sector, endoscopes are today finding widespread use for industrial inspection, monitoring and maintenance tasks. Where accessibility is an issue, remote viewing using an industrial endoscope can negate the need for destructive, time consuming and/or expensive dismantling activities.

Industrial endoscopes are also used for monitoring environments where high radiation levels, extremes of temperature / pressure or contact with corrosive liquids and gases render direct measurements hazardous.

Industrial endoscopes are a proven tool for non-invasive analysis of processes taking place inside operating furnaces and boilers. Resolve Optics has developed and supplied industrial endoscopes to non-invasively analyse high temperature processes including incineration, recycling, smelting and chemical manufacturing.

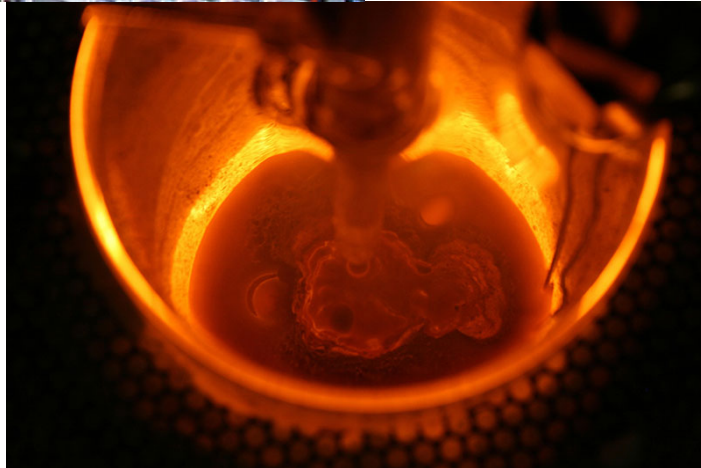
Recently, we were asked to develop a Short Wavelength Infrared (SWIR) endoscopic viewing system to enable inspection of the blades inside a gas turbine engine. To enable inspection during gas turbine operation required that the endoscope had to



operate up to 950 °C at the tip with 150 psi pressure and be able to withstand severe vibration.

To improve the safety of monitoring of the glass vitrification at a leading radioactive waste reprocessing

plant, we developed and supplied an Infrared (IR) endoscope to operate with a high-end thermal camera. Operating at 7-14 microns, the prime function of the IR endoscope was to provide the desired field of view to monitor the vitrification cell and to transfer the image to the bolometer based thermal camera. For added safety the thermal camera was mounted after a 90 degree fold to ensure it was not in the shine path of the radiation.



To download our 2019 company brochure [click here](#).

If you wish to monitor a hazardous process safely and discuss if a remote endoscope is suitable for your application – [click here](#).

PROJECT NEWS:

In this newsletter feature we share with you the latest news on some of the interesting OEM lens design, development and manufacture projects that we are currently working upon.

Radiation Hard Vision System Enables Close-up Inspection

For over 20 years – DEKRA Visatec inspection camera systems have been used by many of the world's leading nuclear organizations. To enable them to offer a new compact inspection system, based on their VTX LRAD-10 PTZ camera, Dekra Visatec approached Resolve Optics to develop a non-browning zoom lens that could offer excellent image

quality for close-up applications in high radiation environments. Marcus Jocham, Business Development manager at DEKRA Visatec said “We chose to enter into a long term partnership with Resolve Optics because of their extraordinary technical support and pedigree in developing and supplying OEM quantities of top quality, high-performance radiation resistant lens”. Mr Jocham added “Combining remote control of lens functions with true high definition quality images, over a 10x zoom range, the motorised non browning lens developed and supplied by Resolve Optics enables our camera system to set a new standard for safe, high quality inspection of hot cells and nuclear fuel rods”.



[Click here](#) for Model 357 technical data sheet.



Fixed Focus Lens Enables 'Point & Shoot' Thermal Imaging

Achieving precise focus with your thermal imaging camera can mean the difference between capturing and identifying or overlooking a problem. If your image is out of focus, then your temperature

measurement is unlikely to be accurate. Based upon this premise – Resolve Optics developed a range of high performance, fixed focus Infrared (IR) lenses to enable a thermal imaging manufacturer to offer a reliable 'point and shoot' troubleshooting camera set-up.

The design goals for this new range of fixed focus IR lenses were to combine high quality, high throughput, compactness and robustness at a competitive target price. Offered in a choice of 40, 80 or 120 mm focal lengths, the resultant fixed focus germanium lenses come with antireflective coatings that provide high performance (f2) throughout the IR waveband (8-14 microns) making them perfect for thermal imaging applications.

[Click here](#) for Model 320 technical data sheet.

This newsletter feature is written to inform you about what's new at Resolve Optics.

Social Media Sensation

Some things make so much sense, you can't understand why you didn't think of it sooner. Social networks are meant to be about shared experiences. Video communicates more in sight, sound and feeling than words or images alone. That's why Resolve Optics has launched its first video introducing you to its Model 228 UV-Visible fingerprinting lens across its LinkedIn, Twitter, Facebook and YouTube social media channels.

[Click here](#) to watch the video.



Quality Update



Did you know – all lenses, optical systems and services we design and supply are covered by ISO 9001:2015 international quality

standards and come with a complete quality test assurance report. As a business, we are also committed to reducing our impact on the environment through our ISO 14001 accredited Environmental Management System.

Making it Easier for Customers

Did you know that Resolve Optics supports invoice processing and takes payments in US Dollars (\$) and Euro's (€) as well as Pounds Sterling (£) saving you time and helping you avoid currency conversion costs?



THE LAST WORD:

[Article Review: Using Photonics to Save the Planet](#)



Left: High efficiency solar panels power homes
Right: LIDAR sensors detect particulate emissions

The global public's consciousness of the importance of preserving our planet is today playing an ever-greater role in forging the direction of photonics innovation – and, conversely, photonics is having a huge impact on helping us reduce our impact on the environment. An interesting recent review article examines how advances in photonic technologies are helping achieve these aims through new sensing and instrumentation tools for environmental monitoring, increasing the energy efficiency of photovoltaic systems, and adopting energy-efficient lighting such as LEDs.

To read article in full: [click here](#).

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