Each issue, Bühler invites leading figures to comment on the key trends and issues in their sector. In this edition Robério Silva, Executive Director of the International Coffee Organization (ICO), discusses the world coffee sector.

The ICO is an intergovernmental organisation which was created to serve the coffee community worldwide. The membership represents 95 per cent of the global production and more than 80 per cent of the worldwide consumption. The ICO provides up-to-date information on markets, conducts research on emerging issues and carries out technical projects to benefit the world coffee economy.

Over the past two decades the coffee sector has been steadily growing. Today, almost 150 million bags of coffee are consumed annually which is 50 per cent more than 20 years ago. We estimate that by 2025 world coffee consumption will reach 175 million bags. This positive trend is driven by strong growth in consumption in emerging markets, rising demand for coffee in producing countries, and increasingly dynamic traditional markets.

Today's consumers do not only drink more but also want better coffee. The rise of speciality coffee has triggered coffee's transformation from a staple into a lifestyle good which puts quality at the centre of the value proposition. The premium paid for high quality coffee can provide important economic benefits to processors and producers, the majority of which are smallholders. Supplying coffee of consistently high quality, however, is not an easy task in view of the many challenges faced by the sector. The basis for an excellent cup of coffee is laid at the farm. Hence, growers' access to inputs, finance and skills needs to be enhanced in order to increase their productivity. To maintain and nurture the quality on coffee's long journey from the farm to the coffee shop or home kitchen, extreme care needs to be taken during post-harvest processing, transporting and roasting. Technological solutions play a crucial role minimising defects and ensuring consistently high product quality and safety in a reliable and economical way, with the ultimate goal of providing consumers worldwide with a unique coffee experience.
Fruit & Vegetables.

High definition cameras improve safety and quality for processors of frozen fruit and vegetables.

With consumers increasingly demanding convenient and fast-to-prepare foods, frozen fruits and vegetables, such as green peas, beans or berries, are a growing market segment in the food industry. At the same time, food safety regulations are tightening and consumers have come to expect an impeccable product. A major concern is the potential presence of foreign materials, such as small stones or pieces of glass, wood or plastic in the packaged product. Optical sorters with InGaAs cameras are highly effective in detecting and removing these objects. Bühler pioneered the use of this sensor technology in optical sorting in 2007. Now, the market leader is introducing InGaAs™ HD. With double the resolution, these high definition cameras are able to detect foreign materials down to half the size previously possible, resulting in substantially better detection and removal. InGaAs™ HD will be available in the SORTEX E product range and will enable processors of frozen fruits and vegetables to meet the highest safety requirements, while ensuring maximum quality of their product.

Frozen fruits and vegetables, such as strawberries, green peas, sweet corn or baby carrots, are a fast growing market segment in the food industry. Not only do they meet the demand for food that is quick and easy to prepare, in or out of season, but they can even be nutritionally superior to retailed fresh produce, as they are harvested at their peak ripeness — when most nutritious — and frozen soon after, preserving their vitamins and antioxidants.

“While increasing amounts of frozen fruits and vegetables are being processed, food safety regulations are tightening in most countries and processors have to guarantee the safety and quality of their products”, is how Stephen Jacobs, Global Product Manager at Bühler, sums up the challenge.

Among the biggest safety concerns are foreign materials, such as small stones, pieces of wood and glass, or slivers of plastic. If contained within packaged frozen food products, they will pose health risks - including lacerations, choking or broken teeth. For food processors, they may result in expensive product recalls and damage to reputation.
With its vast range of optical sorting solutions, Bühler has worked for decades to enable food processors to efficiently identify and remove foreign materials. This is achieved by using a variety of sophisticated detection technologies. InGaAs cameras, for instance, are very effective for separating foreign materials from good product of the same colour. They are based on semiconductor sensors made from indium gallium arsenide alloy and operate in the short wave infra-red range (SWIR). As a consequence, they are able to detect even the subtlest of colour differences that cannot be seen in the visible spectrum.

Bühler pioneered the use of this technology for use in the packing line, as a final check, to ensure that difficult-to-detect packaging materials such as light coloured wood in potatoes, cardboard in carrots and coloured plastic in vegetable mixes, were quickly identified and accurately removed from the product stream.

Bühler has continued to advance this technology and the development of the new InGaAs cameras now mark the latest step in this process: “By combining a new hardware, software and lens package, we were able to engineer a new camera with more than double the resolution. As a result of this in-house development, our sorter will be able to identify foreign material objects down to half the previous size”, as Benedict Deefholts, Head of Sensor Development at Bühler, describes the key advantage of the new HD cameras.

Thanks to this development, Bühler’s sorting solutions for processors of frozen fruits and vegetables now offer even better detection and removal capabilities for a wide processing and packing line and is particularly beneficial for processors with stringent safety specifications such as for the baby food market.

The new InGaAs cameras will be available for Bühler’s SORTEX E product line in 2016. Customers that are already using SORTEX E optical sorters with Enhanced InGaAs cameras will be offered an upgrade option, enabling them to benefit from the improved detection performance of the new HD cameras with their current solution.
Dedicated pulse hulling machine enables processors to capitalise on pulse-based food innovations.

The Bühler Group, a global leader in pulse processing solutions, has launched its PULSROLL™ huller to support processors in their quest to produce innovative pulse products and tap into the burgeoning market for tasty and nutritious food alternatives in which nutrient-rich pulses play a leading role. With its new fully CE and ATEX compliant PULSROLL™ huller, Bühler has introduced a dedicated pulse hulling solution that removes the hull from multiple pulses, efficiently, hygienically and cost effectively allowing worldwide pulse processors to capitalise on the compelling value-added opportunities emerging in this industry.

There is a growing recognition of the exciting potential that pulses hold for the creation of a wider range of food products and that is driving demand for further processed pulse-based products. Not only are pulses gluten-free and high in protein, they represent an excellent substitute for meat. Flours made from the grinding of pulses, such as chickpeas and peas, are increasingly finding their way into conventional foods such as pasta, tortillas and noodles, while ready-to-eat snacks are also benefiting from novel pulse developments that boost their health appeal. This dynamic trend is set to expand yet further during 2016, which the United Nations has proclaimed as ‘International Year of Pulses’; and this places even greater pressure on pulse processors to provide fully processed and added value pulse products to meet market demand.

“In the past, particularly in North America, pulse processing was restricted to just cleaning and then exporting. Now, pulse processors globally are looking to adopt complete hulling and grinding operations, in order to access the increasingly desirable nutrients from the pulses, and extract greater value,” explains Surojit Basu, Global Product Manager at Bühler. “Up until now, rice and grain technologies has been commonly employed for pulse hulling and has been insufficient to meet the quality and quantity requirements of modern, large scale EU and US processors.”

Bühler has responded to this industry challenge with its all-new PULSROLL™, which offers pulse hullers a breakthrough technology and, uniquely, allows multiple varieties of pulses to be handled perfectly on the one
machine, achieving consistently uniform dehulling at the highest of throughputs. Critically, the hygienically-designed PULSROLL™ provides pulse processors with the vital CE and ATEX certification they require to operate safely in today’s increasingly regulated and highly automated industry.

Dedicated to the processing of all major pulses from dry yellow and green peas, to pigeon peas, chickpeas, mung beans and lentils; and drawing on just 15 horsepower - half the power consumption of an average huller - to fulfil on an industry-leading capacity of four tonnes per hour, the PULSROLL™ offers not just all-in-one pulse hulling but also offers processors dramatic savings in energy and therefore significantly reduced production costs.

Pulses are fed by gravity, through the pulse huller, into its milling chamber, where they are subjected to the frictional forces created between several grinding stones and sieves in order to separate the hull from the valuable pulse within. By fine tuning the ‘gap’ between the sieves and grinding stones, processors using the new PULSROLL™ can now easily adjust the ‘grind’ to suit different incoming product. Crucially, the inclination, dictating the flow of the product inside the hulling chamber, can also be altered quickly and easily to accommodate different pulses.

Pivotal to the successful operation of the PULSROLL™ is its machine crafted sectionalised emery grinding stones. These come in varying grit sizes to fulfil the requirements of the specific pulse to be hulled, to ensure optimal hulling performance, with minimal broken product. Hygiene is underscored through the clever use of rubber seals between these stones, which prevent dead zones that could otherwise cause the capture of residual product. This special design feature reduces the potential for microbial contamination, product accumulation or product cross-contamination during changeover, allowing for easier cleaning of the machine and the more rapid and efficient switch from one product to another.

“Among other technical developments within the PULSROLL™, its long life emery grinding stones that typically allow the processing of a minimum of 10,000 tonnes before a change. This is significantly higher than the industry average and reduces downtime and maintenance requirements, and their associated costs,” said Surojit Basu, who confirmed that the robust new and exclusive pulse huller has been created with wear-resistance, ease of use, hygiene and quality defining every element. “An innovative sieve assembly ensures the milling surface is maintained throughout the life of the stones, whilst a strong structural design prolongs the overall life of the machine, and provides the ultimate in product quality time after time.”

Bühler offers both individual equipment solutions and complete processing plants for the processing of pulses, and has over 200 cleaning and SORTEX plants and more than 40 complete plants in operation worldwide. With the introduction of the PULSROLL™, Bühler continues to build on its commitment to global pulse processors by providing them with technology dedicated to handling multiple pulses in the one machine. This supports today’s modern pulse processors in their bid to fulfil on the growing demand for further processed pulse products with the greatest of consistency, efficiency, quality and yield.

Efficient, hygienic removal of hulls from multiple pulse varieties.
Plastics.
Buhler Sortex and NRT join forces to offer a one-stop shop to plastic recyclers.

As the demand for plastic sorting solutions continues to soar, Buhler Sortex, a member of The Bühler Group, and US-based National Recovery Technologies (NRT) are entering a strategic commercial agreement to offer plastics recyclers a complete solution for plastic bottle and flake sorting. The companies are bringing together more than 100 years of combined expertise in optical sorting giving recyclers access to their proven technologies, engineering expertise and their extensive customer service and support networks.

Global plastics production increased by 10 million tonnes, to around 280 million tonnes in 2011, continuing the growth pattern that the industry has enjoyed since 1950 - approximately 9% per annum. Europe and the NAFTA region together comprise 41% of the world’s total plastic materials production - driving demand for integrated bottle and flake sorting solutions, as companies strive to meet government recycling targets and corporate social responsibility pledges.

The partnership between Buhler Sortex and NRT marks a further milestone in their continuing expansion in the PET and HDPE sorting segment, across Europe and North America. It also strengthens their position as the leading joint suppliers of combined plastic bottle and flake sorting solutions to the plastics recycling industry, with leading market technologies such as In-Flight Sorting®, PET Boost™, Label Reduction Kit and Smart-Eject™. They are now the first-choice technology partner for many plastics recyclers, with several contracts already in place with major recycling operators.

Charith Gunawardena, Head of Optical Sorting at Buhler Sortex says: “This landmark agreement signifies our confidence in the future growth of recycling. It also strengthens our industry references and reinforces our leading role in optical sorting, while demonstrating our commitment to providing customers with a complete bottle and flake sorting solution from two trusted leaders in their field.”

With an extensive service support network in all major
recycling markets, plastics recyclers can depend on a comprehensive Buhler Sortex and NRT support network built on solid foundations of technology and service excellence.

This will also provide access to both companies’ wide range of capabilities, including system design, on-site management, installation and product training. The partnership will also include close collaboration with key members of the technology value chain.

Matthias Erdmannsdoerfer, President of NRT, concludes: “This significant partnership agreement is further acknowledgement of our commitment to supply and service leading plastics recyclers with a full portfolio of leading bottle and flake sorting equipment. We’re excited to bring the industry’s first complete offering to market that doesn’t require a plastics recycler to compromise on bottle or flake sorting performance and provides high-quality, local support. We look forward to building a strong partnership with Buhler Sortex and our customers across Europe and North America.”

Two brands, one complete optical sorting solution from bottle to flake.
The Bühler Group, a global leader in processing technologies for the nut industry, is helping a leading Eastern European walnut producer to reduce contamination and meet exacting customer and export specifications with its new technology. The SORTEX E BioVision™ is a single piece of equipment that does the job of two conventional machines – sorting for defects and foreign material simultaneously, allowing for one simple set up and unprecedented removal of hazardous material, mouldy, rotten or diseased nuts.

It is also capable of removing hazardous material up to 50 percent smaller than previously possible, and it does so in a single, sort for many varieties of nuts - including walnuts, almonds, pecans, pistachios and hazelnuts. This solution, which is unique to Bühler, not only minimises losses of good nuts, it also ensures greater accuracy in detecting foreign material while reducing processing time.

Fundamental to the SORTEX E BioVision™ is Bühler’s proprietary high definition BioVision™ detection technology. It analyses the spectral and spatial difference between walnut meat and shell to distinguish subtle differences between a vast range of shell varieties and walnut meat. It is able to detect both textured and smooth shells of varying sizes. Without this technology, a much higher volume of the nut meat may be lost due to false rejections. BioVision™ technology achieves this with a very simple machine set up.

This ground-breaking equipment, launched by Bühler in May 2015, was installed at Moldovan specialist nut grower and processor Monicol in September following extensive trials to test its efficacy and accuracy. Moldova is one of the top 10 walnut producers globally and the third largest supplier of shelled walnuts to the European Union, due to its rich soil and temperate climate of warm summers and mild winters. In 2015/2016 Moldova’s production is expected to hit 40,000 metric tonnes of in-shell walnuts.

Dumitru Vicol, CEO of Monicol said: “The trials were conducted on product with input contamination ranging from 10% to 34%, achieving accept quality of 99%. On trials of input contamination at 15%, the accept quality rose to 99.9%, with no shell found per 1kg. A typical customer requirement allows for one piece of shell in every 10kg, so we were very happy with these results.”

Faisal Baig, Global Product Manager for Optical Sorting
at Bühler, adds: “Sorting walnuts can be challenging for conventional sorters, particularly if the product batch contains shell, septa and dark kernels that all need removing at the same time. Designed with a special optical configuration, BioVision™ is able to perform both sorts simultaneously and can easily handle different varieties and grades of walnuts – in-shell and shelled, including sizes ranging from halves to double-diced and colours ranging from extra light to amber. In addition to removing even the smallest pieces of shell and septa, the SORTEX E BioVision™ with dedicated colour cameras and PROfile™ technology, can remove discoloured, shrivelled, mouldy, insect-damaged and butterball walnuts.”

Monicol, which exports to 17 countries, including Eastern and Western Europe and the United States, harvests its own walnut kernels and acts as a pre-processor, by cracking and pre-cleaning walnuts, before they are sold on to processors and manufacturers. They approached Bühler for a solution that could remove hazardous material, mainly shell, but could also remove foreign material, such as sticks and stones, as well as dark colour defects – the most common defect in walnuts.

Monicol’s Vicol adds: “The new technology is helping our business to grow by achieving greater trust in our products and therefore customer satisfaction. We’re expecting it to play a major part in the on-going efficiency and profitability of our business in the coming months and years.”
Grain.
Advanced cleaning solutions critical to reduction of mycotoxins in cereal grains.

In the past few years, grain processors from across the world have intensified their efforts to ensure safe food and feed, despite a growing number of emerging threats. Due to these threats product specifications are becoming increasingly complex. Matthias Graeber, mycotoxin expert within Bühler’s Corporate Technology Group, discusses how advanced separation and optical sorting solutions can be used to manage the risk of mycotoxins and other hazardous contaminants.

Among the growing number of safety concerns in grains are pathogens such as salmonella, non-declared allergens, such as gluten-containing foreign kernels in gluten-free produce, foreign bodies, and, of increasing importance, the widespread presence of mould fungi and their hazardous metabolites, referred to as mycotoxins. Aflatoxin, deoxynivalenol (DON), Zearalenone (ZEA) and ergot alkaloids are the mycotoxins creating the most concern, as they are common in grains such as wheat, maize, rye, barley and spelt. With some mycotoxins such as the highly-toxic Aflatoxin, the vast majority of grains are not affected, but just a few highly contaminated kernels could make an entire lot unsafe for further use.

One example of an unsafe situation caused by aflatoxins, was in 2012/2013, when South-East European countries were facing a crisis. Contaminated maize was consumed by dairy cows, leading to cases of unsafe levels of the highly toxic aflatoxin M1, in milk intended for human consumption. There has also been a re-emergence of ergot alkaloids in rye in Central Europe, causing the relevant authorities to revise safety assessments and, as a result, ultra-low commercial specifications have been imposed by some companies. Such examples highlight the need to support grain processors in their ongoing efforts to ensure safe products. Through its Food Safety Initiative, Bühler continues developing and offering a comprehensive set of market-specific solutions.

Early intervention - best practice for preventing and eliminating food hazards

In order to control the hazards, grain processors must first follow the guidelines of good agricultural and post-harvest practice, to reduce the risk of hazardous contamination in cereal grains. However, as extreme weather conditions may cause plant stress, making the crop more susceptible to fungal infestations, problems
may still occur, despite following best practice guidelines. In light of these ongoing problems, grain processors require solutions that ensure grain lots comply with commercial specifications and legal maximum levels of toxins. Grain processors also need to make sure any initial contamination does not spread further, by removing the small percentages of hazardous grains, as early as possible in the value chain.

In the case of maize, for instance, in some regions the crop has been severely hit in successive year by different mycotoxins. In response, processors have implemented advanced grain cleaning processes to target the affected grains, not only in mills but upstream in the chain, at both grain reception facilities/grain elevators and warehouse levels.

These advanced grain cleaning methods complement well-established, pre-cleaning processes at grain reception facilities/grain elevators. A good example of this is Bühler's TAS grain cleaner, which is available for large capacities of up to 250 tonnes per hour.

**Consistently reducing mycotoxin levels in the ppb-range, to meet food safety standards**

It is well known that modern grain cleaning technologies can significantly reduce the concentrations of mycotoxins in cereal grains. However, one needs to keep in mind that removing affected grains from a lot can also negatively impact the processor's yield. It is therefore critical to tailor grain cleaning processes in such a way that mycotoxin levels are reduced effectively and consistently, despite the natural variability of the raw product. This process must also be efficient, with minimal loss of good, unaffected product. This is particularly important as there is no technology available that can directly detect mycotoxins, non-destructively, on cereal grains – certainly not at a product flow of many tonnes per hour.

The actual measurement of mycotoxins at the relevant levels – ranging from a few parts per billion (ppb) for aflatoxins to parts per million (ppm) for deoxynivalenol – requires processors to remove a representative sample from the product and then analyse it, using commercially available antibody based test kits or high performance liquid chromatography (HPLC) laboratory analysis. Therefore, instead of actually detecting mycotoxins, modern grain cleaning technologies target the properties that indicate the presence of a fungal contamination and thus the potential of a mycotoxin contamination.

**Processing expertise building on engineering excellence makes the difference**

Following Bühler's dedication to provide innovations for a better world, they have partnered with grain processors and world leading researchers in mycotoxin management, such as the Institute of Sciences of Food Production (ISPA) in Italy, to develop solutions for the cleaning of mycotoxin from cereal grains and to provide conclusive data as reference case studies. The results from these case studies have enabled Bühler experts to define standard flow diagrams, incorporating elements for mechanical separation and optical sorting of grains. For example, size separation, as performed by Bühler's Grain Plus, removes broken kernels from the lot, as these tend to have a higher concentration of mycotoxins.

It has also been found that very light product and dust from affected lots typically contain higher levels of mycotoxins, which can be removed through integrated or separate air aspiration systems. A further separation of lower-density grains, using Bühler’s concentrator options, further decreases the mycotoxin concentration. Finally, an optical sorter such as Bühler’s SORTEX A MultiVision™ detects even the most subtle of colour defects and, using InGaAs technologies, can distinguish anomalies in the non-visible, infrared reflectance of the cereal grains. This part of the electromagnetic spectrum can access information about chemical changes in the grains and has proven to be highly effective.
effective in identifying mycotoxin-contaminated grains.

It is understood that the larger the mycotoxin concentration in the removed product, the more efficient the cleaning process. As a result, the reduction of aflatoxin levels can then be achieved with less good product removed. Figure 1 highlights the results of an actual case study, carried out on an aflatoxin-contaminated lot of maize in an Italian cleaning facility, running at a throughput of 20 tonnes per hour. The results reveal the relative concentration of total aflatoxins in the fractions removed by size separation, aspiration channel, density separation and optical sorting, respectively. The product rejected by the SORTEX A optical sorter, for instance, contained an aflatoxin level of more than 1100 percent of the levels detected in the input material. Such high levels in the removed fractions are a direct result of utilising expert knowledge on the product properties that indicate fungal contaminations, together with world-class engineered optical sorting equipment. This ensures an optimised high capacity product flow, robust high-speed detection of the defective product and accurate ejection.

**Advanced cleaning can also reduce other hazards**

In addition, SORTEX optical sorters reliably remove foreign kernels and foreign materials, which represent a further food safety concern, as they can cause injury if eaten. It is essential to prevent these serious issues, to avoid putting people’s health in danger, as well as risking costly, commercially damaging product recalls and adverse impact on business relationships. The SORTEX portfolio offers a wide range of customisable product options, including advanced proprietary vision and feed systems, allowing processors to meet their exact sorting requirements. These may include, in addition to controlling mycotoxin levels, the removal of discoloured/diseased kernels or the separation of wheat from oats to ensure a gluten free product, or the separation of GMO soy and maize from wheat.

**Ensuring profitability for grain processors**

Bühler’s cleaning solutions for fungal contaminations are available for a wide range of cereal grains, such as wheat, maize, barley and rye, tackling a variety of hazardous fungal contaminations including aflatoxins, DON, ZEA, and ergot alkaloids. Building on outstanding engineering expertise and extensive experience in the reduction of fungal contaminations, in almost any food or feed material, Bühler experts are well placed to identify the solution that is the best match for grain processors needs, ensuring safe food and feed, while maintaining business-critical profitable yields.

**Matthias Graeber**
Head of Corporate Technology Satellite
Mycotoxin expert in Bühler.

---

**Figure 1: Aflatoxin concentration of input and cleaned maize, as well as of the fractions removed by the sequential processing steps.**

The aflatoxin concentration of the input maize has been set to a value of 100 percent. The reduction performance is case specific and may vary for different types of contamination. The sampling followed EU Commission Regulation No 401/2006. Aflatoxin analysis was carried out using HPLC.
Take nearly 70 years of experience, a large portion of customer understanding, and a team of highly motivated Bühler experts from the field of optical sorting and what you get is the most innovative optical rice sorter in the world – the SORTEX S UltraVision™. Here is a look behind the scenes of the development effort.

Unprecedented control, Neil Dyer - global product manager; played a key role in market analysis and deciding final specification, design and style choices.

“The industry demands for optical sorting continues to increase as customers are more focused on product quality than ever before. In response to this market demand, the SORTEX S UltraVision is a completely new machine developed specifically and exclusively for rice. This has enabled us to implement technologies never before seen in the industry, using our experience, since 1947, in the sorting business. The new SORTEX ProSort™ software gives the user total power and fingertip control over each and every product defect, all from a single screen”

Decades of development effort, Ben Deefholts – rice specialist; responsible for initial requirement specification and concept for ease of use.

“We wanted the SORTEX S UltraVision to give customers unprecedented control over the sorter. We ensured that new ideas, such as Textured LED™ Lighting and proprietary multi-chromatic cameras delivered exceptional colour difference, to give customers absolute control over which grains to accept and which to reject. Many of the concepts included in the design of this sorter came from decades of expertise in rice processing and from working with and understanding the needs of our customers.”

Radically new design, Gabriel Hamid – principal research engineer; drove the research into new alignment, characterisation and classification algorithms.

“Sort consistency is key, because it impacts yield and the quality of the accepted rice. New algorithms were required to improve the consistency of image acquisition, camera characterisation and transfer of intelligent modes between individual machines. Each of these challenges was made doubly difficult because the SORTEX S UltraVision is a radically new design, so relevant empirical data was limited. Researchers Chris Davis, Patrick Lancaster and Jean-Francois Deprez applied cutting-edge techniques towards these challenges, resulting in multiple groundbreaking algorithms, specifically created for rice”
SORTEX S UltraVision™ - for rice processors who refuse to compromise.
A whole year counting rice grains, Tony Hug – systems design engineer; drove the lighting and camera choices and designed the image processing software.

“My task was to conduct initial research and feasibility studies into the optimum wavelengths, lighting setups and sensor choice to enhance the detection of subtly defective rice grains. I spent a year counting rice grains, in order to produce algorithms to optimise grain ejection. I recorded the different sorting algorithms in a set of specifications. The SORTEX S UltraVision has been created to optimally sort defective rice grains, with proprietary cameras and long-life lighting, allowing perfect detection of subtly discoloured grains, small spots, and bran streaks. New ejection algorithms and increased ejector density minimise removal of good grains with the bad. The accelerated calibration and product colour tracking system both maximise and maintain consistent system performance.”

Powerful diagnostics tools, James Goldsmith – software team leader; designer of SPLINT (SORTEX Plant Interface).

“With our SPLINT remote connection system, we can connect to any SORTEX S UltraVision in the world. At the push of a button, we can see what the customer is seeing and assist them immediately. SPLINT also allows us to create different interfaces for different users. We provide powerful configuration and diagnostics tools for our engineers, which enables us to place the machine’s complexity behind an easy-to-use interface.”

Easy cleaning, set-up and review, Stewart Mills – principal mechanical development engineer; led development of the new tubular frame concept.

“The SORTEX S UltraVision is uncompromisingly customer focused – with superior hygiene plus easier cleaning, set-up and review of sorting. Practical, frame components are manufactured from tubular sections, which reduces horizontal surfaces and minimises ‘bug traps.’ Other important criteria include protection against dust and easy access for cleaning, in order to ensure stable performance between service engineering visits.”

Global support, Stuart Bashford – head of software and hardware development; led development of the AnywarePro™ system.

“AnywarePro™ is based on the same leading-edge design approach, to the remote control of the optical sorter via the user’s web browser. AnywarePro enables customers’ sorting equipment to be remotely monitored, allowing continuous access to online data for optimising the sorting process, triggering fault alerts and creating system usage statistics. Customers benefit from the identical system features that our global support organisation also uses for ongoing system performance analysis and correction of possible faults.”

Rigorous validation program, Eleanor Martin, applications specialist for rice; technical lead on field validation and application development.

“Introducing such a sophisticated new sorting system means implementing a rigorous validation program, to ensure it meets the high standards expected from the market. Whilst extensive validation tests are performed in-house, proving the machine in a real production environment is a fundamental part of our validation and extremely important. We have worked in partnership with key customers to trial the SORTEX S UltraVision in different rice producing regions globally.”
Coffee.

Bühler collaborates with African processors to optimise coffee production.

The Bühler Group, a global leader in food & material processing and optical sorting solutions, is helping African coffee processors reverse its declining share of the global coffee market and capitalise on the growing global demand for coffee.

In Africa, coffee growing supports more than 10 million households in 25 countries. Some of those depend on coffee as a primary source of income for their rural population and as an important source of export revenues. However, while global consumption climbed 2.3% last year, and Africa's coffee production also rose (by 4% in 2013-2014 to 16.8m 60kg bags, approx. 1m tonnes), its share of world production has decreased from 27.2% in the 1970s to an average of 16% in the 1990s and 13.1% in the 2000s.

Bühler has strengthened its commitment to support Africa’s processors to compete more effectively with other coffee producing continents by helping to improve both coffee quality and productivity. This will, in turn, create new employment opportunities and improve the standard and quality of life of those who rely on the industry for their livelihoods.

As part of its drive and on-going investment in Africa, and continued commitment to support the needs of both small and large coffee processors throughout the continent, Bühler played host to the SORTEX Coffee Forum - a training, knowledge and discussion event - at the Bühler African Milling School, Nairobi on 17-18th September 2015.

Ethiopia is currently the largest coffee producer in Africa, producing 6.6m 60kg bags (396,000 tonnes) in 2013-2014. It is followed by Uganda producing 3.8m 60kg bags (228,000 tonnes), Ivory Coast producing 2.1m bags (126,000 tonnes), Tanzania producing 1m bags (60,000 tonnes) and Kenya producing 850,000 60kg bags (51,000 tonnes). The EU and other traditional markets such as the USA, Canada, Japan and Norway are still the primary markets for coffee, however research shows that demand
is also increasingly strong from emerging markets such as Algeria, Australia, Russia, South Korea, Turkey and Ukraine. Bühler believes that through investment and using its expertise, it can help African countries to satisfy premium export, which are increasingly imposing ever-more stringent quality expectations.

Lawrence Kuhn, Head of Market Development, Middle East and Africa says: “With investment in optical sorting technologies currently on the increase in this region, the SORTEX Coffee Forum was the perfect opportunity for coffee processors to meet with other local businesses, and watch live sorting demonstrations of Bühler’s SORTEX A MultiVision™ and the new cost-effective YJT W range of sorters, all of which are capable of removing discoloured and immature beans plus foreign materials from Arabica and Robusta green coffee varieties.”

Around 50 delegates attended the event and processors were encouraged to come with their machine operators for a series of informative training workshops. The workshops provided practical advice and demonstrations on how to maintain and operate the SORTEX optical sorters to ensure maximum productivity and yield. Forum delegates also had the opportunity to discuss individual sorting requirements and challenges with industry experts.

Kuhn adds that there are already encouraging signs that African producers can see the benefit of greater investment. “Many producers are now investing in new technology, including prestigious players such as the Touton Group, a major international processor of cocoa, coffee, vanilla and spices, which recently upgraded its production facility in the Ivory Coast with two Bühler SORTEX B machines for Robusta coffee. Other customers are Taylor Winch, part of the global commodities trading group Volcafe / ED&F MAN, who selected two SORTEX B ColourVision™ sorters for their plants in Tanzania and Kenya, and CPWE one of Ethiopia’s largest washed Arabica producers and part of Horizon Plantations Ltd, who opted for a SORTEX A MultiVision™.

Presentations at the SORTEX Coffee Forum included a discussion around the Bühler SORTEX product portfolio from Lawrence Kuhn, Head of Market Development – Middle East & Africa, a presentation on Customer Service at Bühler including repairs, spare parts and service packages presented by Patrick Mwitita, Head of Consumer Service, Bühler East Africa and Sorting demonstrations of Arabica and Robusta coffee applications on the SORTEX A MultiVision™ and YJT WB optical sorters from Melvyn Penna, Head of Applications at Bühler SORTEX London and Duncan Makhandia, Bühler Service Engineer, Bühler Kenya.

One of the participants, Peter Kehr, Regional Milling Manager at NKG Coffee Mills Kenya Limited – Kenya’s leading Coffee Miller and a company of Neumann Kaffee Gruppe – remarked that he had participated in the Forum to keep up to date on the latest developments in the Optical Sorting and Processing industry, “with the recognition that Bühler is at the forefront of this industry.”

Bühler’s investment in the region also extends to its work with Partners in Food Solutions (PFS) – a non-profit organisation that links the technical and business expertise of volunteer employees from Bühler and partner companies - General Mills, Cargill, Royal DSM, to small and growing food processors and millers in the developing world.

A growing number of Bühler employees are working as PFS volunteers to support the development of small food producers in Africa, contributing specialist knowledge to help make production as efficient as possible to avoid post-harvest losses. Says Kuhn: “In Africa, there are many food producers who are keen to optimise the opportunities available to them but will benefit from more in-depth expertise. We can do a great deal via projects and training to give producers knowledge of food safety and brand development to further their businesses.”

Earlier this year Bühler opened its new African Milling School in Nairobi, Kenya, dedicated to turning already experienced mill workers into world-recognised professional millers. It also offers further courses to help educate professional millers to the level of Head Miller. Courses are split into six, four-week modules spread over a two-year period.
Employee Focus.
Matthias Graeber, Head of Corporate Technology Satellite at Buhler Sortex.

Matthias Graeber, is Head of Corporate Technology Satellite for the Buhler Sortex Research and Development Department in London. With a PhD in Physics (nanotechnology) from the University of Basel in Switzerland, Matthias began his career as a research scientist and technology scanner in the chemical industry before joining Bühler in 2010. In this interview with the InFocus team, he shares insights into a typical day and reveals how the business is addressing the industry’s growing concerns for food safety and security.

Matthias, can you start by telling us what a typical working day for you involves?

I work on a number of innovation projects with the SORTEX team, as well as other businesses across the Bühler Group.

The nature of my role requires me to travel frequently, however when I am in the office a typical day usually starts with a cup of coffee while responding to my emails. I also work with the project teams on status updates either within Bühler or externally with customers and research institutions, which we work closely with to drive our product innovations. Many of our projects involve innovation partners worldwide, therefore online meetings and video conferences are an essential part of my day.

Please tell us about an area of innovation that you are working on?

Food and feed safety is one of our most important innovation thrusts and optical sorting is a critical processing step in many Bühler solutions to enhance food safety and quality for various commodities and food products.

There are many hazards that can cause safety concerns and the pressure on producers, processors and retailers
can be felt along the entire chain. The risk of Salmonella in
dry foods, for instance, is widely seen as a major challenge
for the industry, as consumer demand for convenient food
intensifies.

In cereal-based products and nuts, mycotoxins remain a
major threat – with the Food and Agriculture Organisation
of the United Nations (FAO) estimating that 25% of the
agricultural crops globally are affected.

In addition, foreign bodies in food pose a physical hazard
and are a severe quality issue. In addition to the safety risk
posed by them, they are also a major cause of costly and
brand-damaging product recalls.

With those concerns in mind, what is Bühler doing to
support the food industry in its efforts to increase food
safety?

Bühler is committed to offering solutions that enable
customers to reach and maintain high safety and quality
levels, whilst safeguarding profitability.

We do this by actively developing our portfolio. For
example, at the Agritechnica show in November, we
launched new mycotoxin reduction lines for cereal grains.
These are based on elements of mechanical cleaning
and optical sorting, put together using experience from
mycotoxin reduction case studies. Bühler’s SORTEX
optical sorting is the cornerstone of this solution.

We understand that Bühler has its own food and feed
safety initiative – can you tell us a little more about it?

Food and feed safety is a global challenge. To give you
just one example, the annual cost of salmonella infections
in the US amounts to USD$3.5 billion. At Bühler, we are
committed to bringing solutions to the marketplace that
enhance food and feed safety, so therefore we have set up
a four-fold strategy, as part of our initiative.

Firstly, we offer dedicated food safety training. Since the
initiative first started in 2011 we have trained more than
400 of our own employees, who now act as food safety
ambassadors in their respective business areas.

Secondly, we are continuously developing our portfolio,
from best-in-class hygienic design to processes dedicated
to remove contamination or inactivate pathogenic
microorganisms.

Thirdly, we continue to build our know-how and credibility
- through extensive case studies on the reduction of
mycotoxin levels achieved in real-life conditions, for
example.

Last but not least, we know that no single player can solve
the safety challenges in the food and feed chain. Therefore
we actively partner with customers, suppliers, and leading
research institutions to bring together expertise in each
area.

Why is continued research into the removal of foreign
material crucial and what solutions are Bühler experts
developing at the moment?

Optical sorting is a vital technology for the detection
and elimination of foreign objects and therefore plays an
important role in integrated safety management systems
such as HACCP.

Optical sorting specialists are constantly working to
develop solutions to help food producers to manage, and
reduce, this risk even further. One specific area of research
for example is into new techniques for identifying foreign
objects that until now have gone undetected, such as
same colour shell fragments in nut kernels with our new
BioVision™ technology.

We have also just launched InGaAs HD cameras for the
SORTEX E range of optical sorters that can detect foreign
objects of up to half the size previously possible.

Food safety can impact food security. Can you
elaborate on how Bühler’s work links with food
security?

Food security is a massive challenge - more than 30% of
the food produced is lost between farm and fork. And
it’s a fact that food production will need to feed 8 billion
people by 2025.

Enhancing food safety can help to reduce losses. For
example, thorough grain drying to achieve safe moisture
levels ensures that no micro-organisms, such as mould,
fungi or spoilage bacteria, grow excessively during
storage. This in turn reduces the risk of mycotoxin
formation, as well as minimising storage losses due
to microbial activity. When cleaning or sorting affected
raw materials it is essential to be highly selective in the
separation – ensuring that the reduction of mycotoxin
concentrations is achieved with minimal product removed
– which of course also ensures yields are kept at a
profitable level.

Building partnerships across the supply chain is critical as
no single company can solve the challenges that lie ahead.

**Can you tell us a little more about how Bühler works with customers and industry partners?**

Open and collaborative innovation is essential for us. Our partners include customers that share with us the challenges they face and the needs of their business. We then work with them to explore common ground. Likewise, we work closely with our suppliers to bring new and disruptive technologies to the table.

We also place great importance on networks such as the Open Innovation Forum run by the University of Cambridge, and research institutions. For example, in the UK, we are currently working with Campden BRI, the University of Nottingham, University College London, and Imperial College.

**How exactly does Bühler involve customers in research and innovation?**

To give you an example, this year we worked with a large milling group and a leading analytical laboratory to better understand and verify the reduction of a specific mycotoxin in the cleaning section of grain mills.

The results from this case study reveal which cleaning processes are most effective for reducing these toxins and we are now looking at how we can use these results to develop and offer solutions to enhance the safety levels for consumers even further.

**What do you think the future holds for food safety and security?**

There is no doubt that our customers will continue to feel increased pressure around food safety issues.

We expect to see new legal maximum levels and tightened commercial specifications across all food and feed markets. Emerging analytical methods enable the measurement of tiniest amounts of contaminations – at the same time there are no more local markets, with the power of social media making any food safety incident a global issue within hours. I am also convinced that ‘Big Data’ and the ‘Internet of Things’ will play important roles in future food safety systems.

With respect to the required safety levels, there is an expectation in the industry that in the future “Food will go pharma and feed will go food”. I would also like to stress the point that already now some processors have managed to turn the threat into an opportunity – for example creating a service business from removing mycotoxins from grains, nuts, or dried fruit.

Therefore, I am sure that enhancing food safety will remain a main strategic direction of our research activities for years to come.

In terms of food security, Bühler will continue to provide innovative processing solutions for established and emerging markets that reduce losses and help ensure a sustainable development of businesses.

©The Bühler Group 2015.

SORTEX® is an internationally registered trademark of The Bühler Group.