

December 2022



We are **UMBRA GROUP**



WE'RE **FIRST**, WE'RE **FIFTY**



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The Voice of the CEO
**50 years: a 2022
to remember**

The point of the President
**2022: our special
year**

UMBRA GROUP
goes all in on Urban
Air Mobility

“

It’s in the deepest darkness
that the truest light is hidden.

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50 years: a 2022 to remember

April 1, 1972 – April 1, 2022: 50 years of UMBRAGROUP



Matteo Notarangelo
CEO UMBRAGROUP

The year will surely remain impressed in our memories especially because of this important anniversary. We're speaking of a great milestone, of an occasion on which to go back over our history, but also a time to look forward to the future, to the new challenges, to the new goals to be achieved.

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Before I tell you about the emotions of this half-century of history, I'd like to focus on the Group's trend in 2022.

It was a year in which the international political context, as we already saw at the start of the year, presented a number of significant critical issues: in addition to COVID, the increase in the price of raw materials and the difficulties in procuring them created problems for our Supply Chain; the world economy is experiencing major problems, such as inflation. In spite of this context of uncertainty, in which the war between Ukraine and Russia is still raging, we managed to hold our own in a difficult market.

With regard to the German subsidiaries, at Praezisionskugeln Eltmann we registered an increase in the turnover of several main customers. A struggling wind power sector is counterbalanced by an improving aerospace market. We are working on new supplies and new sales volumes, as well as new customers. As for the quality aspect, the Nadcap Audit was passed without findings, thanks to the excellent work done by the Team. The R&D department is working on new industrial engineering projects to guarantee future growth. We also have a positive trend going at Kuhn. We are working on our relationships with our customers, regaining their trust in our engineering and quality, concentrating on new contracts, and creating new jobs.

As far as the parent company is concerned, in the industrial sector, we are receiving requests to supply recirculating ball screws from potential

new customers, and are seeing an increase in the biomedical sector volumes. We are also registering growing volumes in robot applications, and are developing new injection molding prototypes. For electromechanical actuators, also, we are developing new prototypes and new programs, in addition to new opportunities for Drive by Wire solutions. As for bearings, new bearings have been designed and developed for our main customer, and we have developed new prototypes for a new one. The volumes of electrospindles for applications on wood and marble are also significant. In the aerospace and defense sector, also, 2022 consecrated the work done in past years. We acquired new customers who enabled us to enter new programs [A350, UAM actuation] and new products [Airbus Helicopters Innovation Award, new helicopter and fixed-wing demonstrators]; we also revisited old programs, projecting them into the future.

The commercial market is experiencing strong growth and is set to reach and exceed the pre-pandemic level of 2019. We are entering new markets, like Urban Air Mobility. UMBRAGROUP meets and surpasses all the high-level key parameters, making us one of the best companies of our category for aerospace actuation solutions: values, credibility, sustainability, innovation, capacity for rapid growth, and retention of talents.

There was also no lack of satisfaction at our American locations. At Linear Motion LLC., we were selected in new strategic programs, in both the civil aviation and defense sectors, and for both recirculating ball screws and electromechanical actuators. We also received orders for a new program in the submarine sector. Lastly, the company sponsored a donation to the Fondazione Valter Baldaccini for Emmaus House, to which the sum of \$7,000 was donated to support women in their reintegration into society. At Umbra Cuscinetti Inc. we worked intensively on the reorganization of the team, a lengthy process that ended with excellent results. Our work was recognized by the important Rolls-Royce Defense Most Improved Supplier Award 2022, as the supplier that made the biggest improvements during the year.

As I was saying, 2022 is, above all, the year of our

50th anniversary.

I asked several colleagues for a word to represent this half-century of history. I want to share some of them with you:

Valter – emotions – family – being together – involvement – bearings – management buyout- challenges – stability – change – sense of belonging – plant – roots – seed – culture – Cronidur – person – second home – FIRST – one of UMBRA.

Perhaps what has stayed with me the most, listening to the people, has been the passion I saw in their eyes.

Ours is a reality with a beautiful past. But what counts most now is what we'll do in the future. The future will probably present us with a spotty, scattered globalization. We will have to be good at what we do, and ready. And the first qualities we will have to have will be agility and the ability to adapt to change. To do this, the guiding factors to follow in our work will continue to be Innovation and People.

We are investing in technology, and will continue to do so, and we've filed numerous patents. The most recent in the actuation sector have to do with new electromechanical actuator architectures: rotary actuator, fault tolerant, new solutions for electric motors in hybrid propulsion. These offer a fine sampling of applications for an increasingly sustainable energy future: decarbonized, digitized, and decentralized. We want to inspire our customers and be an intelligent partner capable of anticipating their needs.

Furthermore, we are aware that people will provide more and more a competitive advantage in the future. Working with the region to train, attract, develop, and retain people is one of our priorities. We have to invest in intelligence, in brain power. We will be more and more an organized Group with a structured global presence, both to be close to our customers and to manage a supply chain on a global scale.

Above all, we will be more and more a team of people working together for a common good, for the good of our company, because together we are – and will continue to be – UMBRAGROUP.

Happy 50th to all of you, and Merry Christmas to everyone and your families.

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2022: our special year



Reno Ortolani
Chairman of the UMBRAGROUP Board of Directors

2022 has been a special year for UMBRAGROUP. It's been a year of change, during which we saw the new Board of Directors and Managing Director at work, we reconnected with old customers and suppliers, and we established relations with new ones. These were developments in the spirit of the Umbra tradition, in continuation with the values that have always been our guiding star.

2022 is also the year of our 50th anniversary. We've come a long way from when, back in 1993, Valter and I decided to invest body and soul in a company that would have otherwise vanished from Italy. Since then – or rather, since its foundation on April 1, 1972 – UMBRAGROUP has grown, from a small FAG supplier to a world leader in the manufacture of recirculating ball screws for the aerospace sector, and to electromechanical actuation. From the 95 employees of 1972 we've grown to 710 at the Via V. Baldaccini site, adding 400 in the other plants, for a total of 1,110 employees (without counting the increase in jobs in the local and non-local satellite industries). From a turnover of around 1.7 million euros in 1973, we've arrived at 200 million euros this year.

For those who need to see the numbers to measure the success, here they are: they bear witness to the fact that the fears and difficulties we've dealt with up to today have done nothing more than drive us to overcome every obstacle. Our strength, along this path, has been the people. The sense



of belonging, the team spirit, the will to do of all those who are and have been a part of Umbra, guided by the ideas, principles, and example of Valter Baldaccini, have made this company great. The management, illuminated by this beacon, has earned the customers' esteem and, wherever it may have become strained, worked hard to restore it. After fifty years, we're still here, telling our story. After so many years, we've become, and still are, FIRST.

Being a company of success in the region brings not only great satisfaction, but also great responsibilities. They are the R and the S of our FIRST: Respect and Social development, which permeate all our actions toward our commercial partners, but also toward the community around us. We live in a world that is increasingly disturbed by economic-social instability, in which the gap between the haves and have-nots grows day by day, with large conflicts arising out of small differences. During this difficult period in history, UMBRAGROUP wants to strive to give

the community, near and far, as much stability as possible. We do it with the quality of our work, with the attention to the health and safety issues of our employees, with innovation in the area of environmental protection, and with all the solidarity projects we sponsor together with the Fondazione Valter Baldaccini.

With the support of all of you – employees, customers, suppliers, and institutions – UMBRAGROUP intends to continue along its path of growth. Through our passion and innovation, we will continue to be FIRST, and we will not cease working to make the world in which we operate a better place for us and our families.

To all of you and your families go my heartfelt wishes for Happy Holidays.

2022 a FIRST year!

Sara Bordoni

Marketing & Communication Coordinator UMBRAGROUP

Will 2022 be a year to remember?

That's a classic question when December rolls around.

2022 was certainly a year marked by many extraordinary events, both positive and unpleasant.

It was certainly an ambiguous year, starting once again with the continuing pandemic, which then turned into a rush to return "to normality": person-to-person contact, in-person events, the chance to look people in the eye, to discover a smile by getting rid of the mask.

And so here we are, in our new office, taking stock of 2022!

For us at UMBRAGROUP, it will surely be a memorable year: on April 1st we celebrated our 50th Anniversary, cutting our cake virtually together with the other companies of the Group!

After an initial timid return to sociability, UMBRAGROUP's doors were reopened.

Meetings, visits to the company by customers and suppliers, the resumption of Italian and international events: UMBRAGROUP returned as a major player at trade fairs, exhibitions, and conferences, for both the industrial and aeronautical markets. There were various opportunities for discussion and interaction on the major stages of the sector: the Farnborough International Airshow with a booth set up together with the Umbria Aerospace Cluster, and the participation at EuroBlech 2022, the 26th International Sheet Metal Working Technology

Beatrice Bandinelli

Communication Officer UMBRAGROUP SpA

Exhibition, with our own booth focusing on electrification and sustainability. On these occasions, we took part at the Group level by coordinating and managing the image, in order to make sure our brand had the proper visibility and recognizability.

We also received prestigious awards at both the Italian and the international level.

After winning the Innovation Award 2022 from Airbus Helicopters in February, UMBRAGROUP, represented by the subsidiary Umbra Cuscinetti Inc., was presented with the Rolls-Royce Defense Most Improved Supplier Award 2022.

Then, in Italy, we were selected by ItalyPost's Study Center in collaboration with the Corriere della Sera newspaper as one of the 1,000 Champion Enterprises of 2022 and included among the 200 best companies with turnover between 50 and 500 million euros.

In terms of quality, also, our brand continued to make a difference in the Aerospace sector by passing, with the "Highest Merit" status, the Nadcap PRI Audit for galvanic processes. Lastly, we had the honor of being chosen to speak at the TSAS (Towards Sustainable Aviation Summit) international conference, focusing on electromechanical actuation for more sustainable aviation.

In a 2022 year where the key words were sustainability and innovation, as the parent company we stepped forward for our region



Some UMBRAGROUP Board members cut the 50th anniversary cake during "UMBAGROUP's 50th Anniversary, we're FIRST, we're FIFTY"

and our community: we adopted a beehive, in collaboration with our partner 3Bee, to support a beekeeper in the region who uses totally sustainable methods to preserve the biodiversity of bees. Honey from this hive was gifted to our stakeholders during the 50th Anniversary festivities.

If the first half of the year seems busy, wait until you read about everything that happened from July to December! Our office has been in a real turmoil! On returning from the summer vacation days, we were met with the first big challenge: the celebration of our 50th anniversary with our strategic customers. The organization activities began in April and, during the summer and through until the end of the event, had us working hard on its organization down to the smallest details. But that's another story, which you can read about on the next page!

After a three-year "pause" and a virtual edition, we also brought back the Annual Suppliers Meeting, made all the more special by its timing with our anniversary. There was a whole morning of discussion and sharing based on trusted collaboration with our strategic partners: a spotlight on the year's progress, but above all a look at the future, the most significant projects, and the goals to be achieved. Sharing core values and business opportunities were a recurring theme in the various speeches. Then the best suppliers received awards: Elettrostamperie Poppi for Aerospace Improvement & Competitiveness and Utility for KPI Performance of the sector; in the

industrial market, Stilma S.p.A. for Improvement & Competitiveness, and Fomas Group for KPI Performance. The day ended with a celebration of our 50 years of activity: a milestone made possible also by the valuable collaboration, commitment, and achievement of goals shared with the Group's most important suppliers.

And now?

The most magical time of the year is arriving, the ideal time for winding up the celebrations of our 50th Anniversary, the ideal time to do it with the beating heart of UMBRAGROUP: the people, all of us!

We'll celebrate this important milestone with all our employees on the occasion of "Our Christmas". We've organized, for the Foligno headquarters, three events for three different occasions, in which the main players will be ourselves and our families. The period of festivities will begin on December 7th, with a children's event: we'll turn on the Christmas lights and Santa Claus will arrive. The next event will be on December 18th, with a Christmas dinner celebration. And lastly, on December 20th, we'll welcome Julio Velasco, the greatest volleyball coach of all time and an outstanding motivator for a moment of inspiration and reflection with us all. The recurring themes of this presentation will be common values: the understanding and value of people, and the strength of a team. This was our 2022, a year that was both rich and intense.

The final assessment is up to you. As always, we're counting on your opinion!



The team that organized the "UMBRA GROUP 50th Anniversary, we're FIRST, we're FIFTY"

A Group *puzzle* in the shape of a "50"

Beatrice Bandinelli
Communication Officer UMBRA GROUP SpA

Organizing celebrations for the 50th anniversary of a company like UMBRA GROUP? Celebrations to which people coming from all over Europe and the United States are invited? In which you find yourself corresponding with e-mail addresses with domains like Boeing, Schaeffler, TRUMPF, Airbus, and all the biggest names of our sector?

A year ago all this wouldn't have been even imaginable.

A year ago, I hadn't even crossed paths with UMBRA GROUP yet.

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Then the day arrives, September 16th, and all the pieces of the puzzle which, until the day before, you were afraid you wouldn't have been able to put together, fall into place. And not only that: they fit perfectly..

”

And now here I am, less than three months after my arrival at the company, immediately sucked into a vortex of meetings, e-mails, phone calls (in all the languages of the world), and location-scouting, trying to take care of every last detail, so that everything will be just perfect.

And so? So little time, and so much to do! All I can do is get in the car, driven by Sara Bordoni, the Marketing & Communication Coordinator, and run all over Umbria trying to make all the puzzle pieces fit together in order to compose a day of events in perfect Umbra style.

At the end, day after day, we realize that the heart of our puzzle is Foligno, just as it's the heart of UMBRA GROUP, after all. We can't think of a better way than to celebrate here, in the town where everything started 50 years ago.

A day between Foligno's 15th century of Palazzo Trinci and the UMBRA GROUP's innovation of Via Baldaccini, to wind it all up in a picturesque street of the historic center that holds a valuable

Folignate Gothic gem: the Auditorium of Santa Caterina.

So to sum up: a single day, three different locations, distributed across three different times of the day, different guests for each time, two dress codes, communications, food intolerances, shuttle buses for moving around, three hotels, plane tickets... and what else?

So much collaboration, "laughing to take the edge off", back and forth to and from the office, missed phone calls, installation and dismantling, summer sunsets at the company and pizza after the location scouting, because "to see the effect of the lights, we have to wait for the sun to go down."

Then the day arrives, September 16th, and all the pieces of the puzzle which, until the day before, you were afraid you wouldn't have been able to put together, fall into place. And not only that: they fit perfectly.

And then, at 2 a.m., at the end of a day that simply flew by, with sore feet and adrenalin still flowing, it dawns on you that everything that was created in less than 6 months is a true gesture of recognition. Recognition toward a community, always at the center of the daily activities, toward the customers and stakeholders, without whom the 50 years would have been a mirage, and lastly, toward every single person who has worked, works, and will work for this incredible reality called UMBRA GROUP.

And then, a split second before closing your eyes, you smile. After it all, September 17th has arrived!

UMBAGROUP goes all in on *Urban Air Mobility* (UAM)

Nicola Bacelli
Group VP Sales, Aerospace OEM & MRO UMBAGROUP

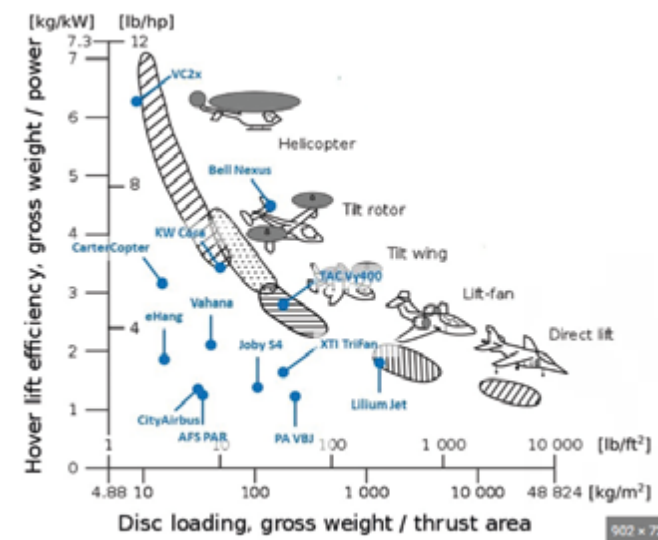
The year 2022 will be remembered as a special one in UMBAGROUP's history. Not just because we reached the 50-year milestone, or because we won the prestigious Innovation Award received from Airbus Helicopters, but also because we had the courage to go all in on eVTOL.



Supernal SA-1 Concept Vehicle



Supernal SA-1 Concept Vehicle



The term "eVTOL" (electric vertical take-off and landing) refers to a new type of flying machines characterized by electric or hybrid power and with vertical take-off and landing, suitable for meeting the future needs for the new UAM (Urban Air Mobility) vehicles.

This is a totally new market, which doesn't even exist yet, but which has an estimated potential of 300 billion dollars. Competing for slices of this huge pie are some very well-known names: The Boeing Company, Airbus, Embraer, Honda, Toyota and Hyundai.

The visibility attained internationally by UMBAGROUP thanks to its innovative patents has enabled us to join the inner circle of those who are in the game for the slender wings of the aircraft of the future.

Just like in sci-fi films, where flying machines of the strangest shapes whizz by at different heights, a new world of investors has designed a future in which there will be new flying machines with or without pilots, totally electric or hybrid, which will be integrated with the current transportation infrastructure to streamline and facilitate passenger transportation in highly congested areas or where there is no infrastructure at all.

This is a new chapter in the history of UMBAGROUP which, on reaching its 50th anniversary, is by now mature enough to tackle challenges as a true protagonist, and to collaborate directly both with the Aerospace OEMs and with structured automobile companies that are getting ready to develop the flying machines of the future for which the new certification bases have just been defined.

We'll be there!

On the *electrification* train

Daniele Frillici
Sales Manager Industrial UMBRAGROUP SpA

As is the case every year, the period from September to November is characterized by the main trade fairs of the sector, which in Europe run along an Italian-German axis. But never so much as this year have the autumn months witnessed such a succession of international-level appointments, to the point of almost overlapping each other.

It's the post-pandemic effect, finally allowing the major players of the respective markets to return to showing their solutions with visitors actually present, and the visitors have flocked to the events. In such a lively context, UMBRAGROUP's Industrial Line has certainly not stayed on the sidelines, and in addition to visiting the events of greatest interest, it had a booth at the EuroBlech in Hannover to show its solutions for builders of sheet metal machinery. All the sector's leaders were present, for example TRUMPF, Prima Power, Salvagnini, Bystronic, Mazak, and LVD Strippit.

In the booth, a backlit wall showed the positioning of the UMBRAGROUP brand solutions within a paneling machine shown schematically for the demonstration. The visitors showed significant interest in the products presented. In particular, the electromechanical actuators for sheet metal

handling, bending, punching, and 3D laser cutting attracted the attention of the operators visiting the fair. The sheet metal sector is one that appears to be buzzing despite some clouds overhanging a 2023 with some question marks.

But the common thread tying together the great majority of the exhibitors is the electrification process, which seems increasingly unstoppable and which is a pillar of UMBRAGROUP's strategy. This does not just concern sheet metal machinery, but also other applications that characterized the fairs visited during the recent weeks. The BiMu in Milan showcased the most well-known machine tool manufacturers. Both geographically speaking and with regard to the experience acquired in the field, our brand is well known, and UMBRAGROUP's reputation appears strong, with a number of opportunities on the horizon. Electrification is emerging with the greatest vigor in those sectors which until just a short time ago were completely the preserve of hydraulics.

This goes, in particular, for the builders of machines for plastics, the protagonists of the "K" fair in Düsseldorf, and for the off-road mobility solutions which were a big hit at a packed Bauma fair in



The Sales Industrial Team at our stand during EuroBLECH 2022, in Hannover

Munich. These two events both had a tremendous number of pavilions, exhibitors, and visitors, bearing witness to a growing enthusiasm for the use of new-generation systems with high technological content. Electrification does not just mean sustainability, but also efficiency.

There are numerous advantages over hydraulic systems. An all-electric solution generates energy savings of up to 40%, makes it possible to do completely without hydraulic oil, considerably reduces noise, significantly raises the degree of precision and, last but not least, represents a real step forward in the process of sustainability thanks to the possibility of regenerating the product: less energy waste, and greater reuse of raw materials and components.

For some time now UMBRAGROUP has been on this train, which is moving at increasing speed, and it

has no intention of getting off in the coming years.

The question to ask ourselves is not whether this process has a future, but instead what areas and what types of products we should direct our efforts on, in order to be more and more protagonists of a green revolution, whose contours are not yet well defined, but which offers unprecedented prospects.

Electric Power Steering (EPS)

UMBAGROUP *heading for a sustainable mobility*

Massimiliano Bosi

EMA Project Development UMBAGROUP SpA

One of the most important projects on which the Industrial Design & Development [D&D] Team has been working over the past year has been the design, development, and production of an innovative electromechanical steering system for forklift trucks using Steer-by-Wire technology.

This term is used to indicate steering systems in which all mechanical connections between the steering wheel and the wheels are eliminated, connecting them, instead, by electrical wires.

The UMBAGROUP Industrial Team has identified the large forklift truck sector as the ideal one for the development of the new system, both from the environmental sustainability and energy savings standpoint, and because of the difficult availability of electromechanical steering solutions already on the market.

Building on decades of experience in electromechanical actuation and some previous experience in the sector, the Team accepted the challenge presented by a potential new customer, consisting of replacing the current hydraulic steering system of a medium-tonnage forklift truck with an electromechanical system of equal size and interfaces, capable of achieving, and in some

cases even surpassing, its challenging performance levels.

The goal was to provide the customer with a turnkey system that is compact, simple to use, and easy to integrate into their machine, replacing the hydraulic system.

The Industrial Design & Development Team immediately made its know-how available to provide the customer with an electromechanical system called EPS, "Electric Power Steering".

The first step of the project was the formalization of the technical requirements of the new electromechanical system. Based on the results obtained, and starting from a lab prototype which had already been built in the past, the Industrial D&D Team succeeded in determining, through a number of group brainstorming sessions, all the possible product design improvements necessary to achieve the requested performance.

The activities described resulted in the design and creation of a new electromechanical actuator [EMA]. This project involved the UMBAGROUP Industrial Team across the board, with activities in D&D, Purchasing, Quality, Planning, and Program Management, Production, and Assembly.

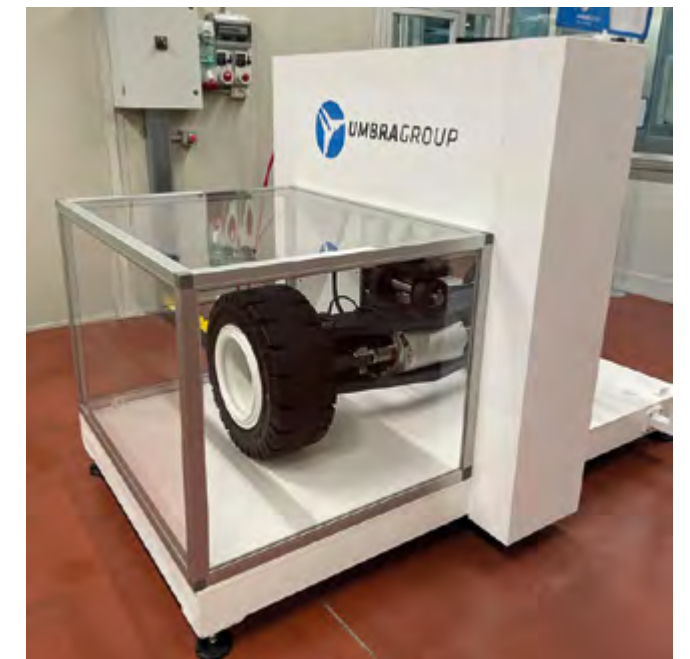


The Industrial Design & Development Team

In addition, with a view to providing a complete solution, the Industrial D&D Team worked together with the other project partners to create a kit consisting not only of the electromechanical actuator, but also of a steering wheel and an electronic control unit that regulates communication between the steering wheel and the wheels, so as to ensure the system drivability. Field tests recently carried out with the end customer present were successful, allowing us to demonstrate the operation of the new EPS system in real forklift truck working conditions.

Based on the first promising results, a new bench was also built and set up in the Industrial Testing Room, to simulate the real operating conditions of the forklift truck and in which the new UMBAGROUP EPS system could be installed. This bench, in addition to enabling the Industrial D&D Team to continue their continuous improvement work on system, is also an interesting demonstrator of the technology developed for current and potential customers.

The wheel steering system electrification project is to be viewed not only as the first, fundamental step for the progressive electrification of the other axles of the forklift truck, but also as an important



Electric Power Steering [EPS] demonstrator at the UMBAGROUP Test Lab

prerequisite for the development of autonomous and remote-controlled driving systems, effectively opening the door to the fast-growing "off-highway" electric mobility market (represented by lifting equipment, agricultural equipment, diggers, etc.) with economic and employment potential for UMBAGROUP.

“He who plants tamarinds does *not* harvest tamarinds”

Mirko Canfarini
Manager Group Marketing,
Business Development & Sales MRO
UMBRA GROUP SpA

Thus states an ancient oriental proverb. As a matter of fact, according to popular belief, the tamarind plant takes about 90 years before it produces its first fruits. Thus the message in this ancient saying is one of farsightedness and love for one's neighbor.

What does the tamarind have to do with the Aerospace Aftermarket world? Well, in reality quite a bit... indeed, a great deal!

When a new Aftermarket program is acquired, or immediately after such an acquisition, negotiations begin with the customer to decide the contractual terms for the maintenance of the new product. The critical parts and the qualification data are analyzed, and a manual and maintenance plan are drafted.

Considering the fact that, after acquisition of a new program, the development and qualification phase takes 4-5 years (depending on its complexity), and that a new product typically needs no maintenance for the first 5-10 years of its operation, it can be immediately understood that the first “fruits” of the



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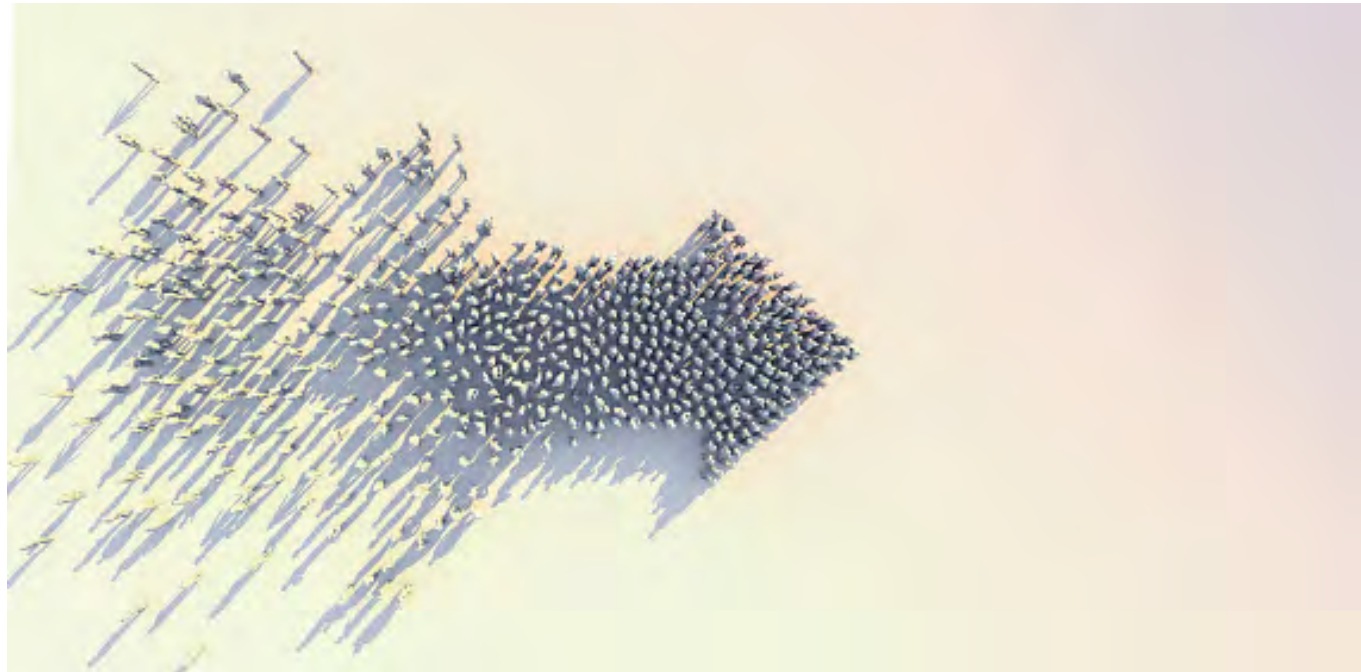
Being a father makes you consider new prospects that go beyond your lifetime, and it makes me approach negotiations with a state of mind free from constraints and short-term logic.

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negotiation will not arrive before 10-15 years out. So it's clear that at the dawn of my 47 years of age, and after 27 years working with UMBRA GROUP, in all probability I won't be the one to harvest them, or at least not all of them!

To be sincere, I started to become fully aware of this condition after I recently became a father. Being a father makes you consider new prospects that go beyond your lifetime, and it makes me approach negotiations with a state of mind free from constraints and short-term logic.

Today we are here eating tamarinds because someone before us planted tamarinds, and it is our moral obligation to continue to plant others for the future generations.



The *Right* People at the Right Time

Ryan Rayburn

Environmental, Health, & Safety Manager, Umbra Cuscinetti Inc.

I think I know how ancient Egyptians felt pulling alabaster blocks out of the quarry. Except I wasn't pulling blocks, I was pushing a 7-foot tall, 800 lb. waste solution pretreatment cart through the Umbra Cuscinetti Inc. (UCI) shop. I couldn't see where I was going and it was an ergonomic challenge. This story is one of both collaboration and innovation.

Let me start at the beginning. UCI has a Nital Etch Laboratory. Nital is part of a non-destructive inspection process to detect overheating of steel parts. Monthly we were disposing detergent, nitric acid, hydrochloric acid, and sodium hydroxide solutions; 12,000 lbs. of hazardous waste per year. Once a month, every month. One goal was to remain as a medium quantity generator (MQG) of hazardous waste; less regulation, less cost. Twelve thousand pounds was heading us in the wrong direction.

UCI does not have chemical engineering expertise in-house. In my search for a better, more efficient process, I found Mike Johnson, Principal Chemical Engineer, an outside consulting chemical engineer.

Mike evaluated our laboratory process and mentioned that the hazardous waste disposal facility simply neutralizes our solutions and sends them down their drain. At UCI you can do the same thing, he said.

Lindsay Davidge, Project Chemical Engineer is also an outside consulting. Lindsay developed a testing and filtration study of the spent Nital solutions and determined that chrome and nickel were our metals of concern. Brainstorming with Lindsay lead to a mobile cart that could collect waste solutions and filter particulates and metals in solution. Lindsay sketched a pretreatment cart that collected the waste chemical solutions. The discharge had to meet Industrial Wastewater Discharge permit thresholds including pH and metals concentrations. Along with a neutralization strategy, the plan was submitted to City and State agencies for authorization. The plan was accepted and a permit issued.

Lindsay's hand drawn cart design

Brady Peterson, Vice President is an outside sheet metal fabricator. Lindsay, Brady, and I reviewed Lindsay's drawing and Brady fabricated our pretreatment cart. The cart worked as designed but the 85-gal solution collection tank was too tall and the solutions too heavy. Consulting again with Brady, the cart was reduced in size and its filtration

support structure reinforced. Now the cart is lighter, easier to push, and the user can see where they are going.

After neutralizing, filtering, and discharging the solutions, we were left with a heavy, watery sludge. I turned to Cathryn Carrothers, Principal Engineer, an engineer who specializes in regulatory analysis and compliance. Cathryn and I discussed ideas for sludge reduction. The most cost-efficient sludge reduction option was an evaporation oven. The leftover particulates, less weighty and voluminous, are then disposed of as hazardous waste.

Sometimes outside ideas and perspectives are what is needed. The folks we collaborated with in this scenario were uniquely qualified in their field of expertise. UCI worked together with these consultants to formulate, engineer, and construct a cost efficient and safe solution for handling and treating Nital waste solutions.

Improvements:

- » Brought all chemical handling operations in-house
- » Reduced tank change-outs from monthly to quarterly (at full capacity)
- » Reduced chemical usage 67%
- » Reduced lab annual hazardous waste: 12,000 lbs. to 10 lbs.

The right people can work wonders. Right people, right solutions.



Disposal of chemical solutions at Umbra Cuscinetti Inc.

A summer of *innovation* and *social responsibility*

Marylynn McPhail

Executive Assistant Linear Motion LLC.

Despite 2022 being a challenging year, we here in Saginaw are continuing with innovation and improvements, starting with our newly painted floors throughout the shop, improving aisle safety and overall aesthetics.

We have also installed new LED lighting throughout the shop – these are an energy efficiency improvement as well as great enhancements to the visibility/light/color within the shop, which will improve safety and the mental health of employees.

Along with the new LED lighting, we have also painted the ceilings throughout the shop. To help us with our production requirements we have also purchased some new machines including:

- » Doosan mill – this was a new mill that was put in to replace an outdated piece of equipment.
- » Doimak grinder – a new grinding machine that we purchased and got in place this year [shipped from Spain]. It has a broader range of grinding capabilities, as compared to other grinders that we have, and will be a huge asset once it starts running production.
- » Leistritz whirler – whirling machine that came from Italy and was installed this year. UMBRAGROUP and Linear Motion LLC. worked together to get this piece of equipment here and help improve the throughput speeds of the whirling cell.
- » 10' Induction Scanner – slated to arrive in Q1 of 2023. This will be a massive improvement to our heat treat capability.



The Linear Motion LLC. Team during the Mid-Michigan Career Quest

We here in Saginaw have also embodied our Social Responsibility. We most recently partnered with SVSU and Michigan Works by attending the Mid-Michigan Career Quest wherein 6000 sophomore aged students from the Mid-Michigan area attended a multi-company career fair at Saginaw Valley State University.

The children were able to learn about multiple employers in the area including UMBRAGROUP. We have also been working with the Saginaw Career Complex introducing children in the area to aerospace and donating tooling and machines to both the Saginaw Career Complex and Delta College.

In June the Navy landed their V22 aircraft at the Harry Brown Airport in Saginaw. This was a wonderful event wherein all employees and their families were invited to watch the V22 land and

take off. Our local veteran volunteers at the airport helped with showing the families around their museum and the aircraft items onsite.

Our Union and employees partnered to raise over 600 pounds of food for the Veterans' Food Bank located at the Harry Brown Airport. The Join Activity Team have held several events throughout the last few months including our Annual Jim Rivett Memorial Gold Outing, wherein we were able to raise funds to donate the ALS. We have continued to grow within our community by attending Saginaw Chamber Events and partnering with Saginaw Future to help grow our imprint in the Saginaw Community.

Interview a Thomas Neugenbauer

Thomas Neugebauer

Quality Assurance Manager KUHN Präzisionsspindeln und Gewindetechnik GmbH
Specialist Quality Assurance Präzisionskugeln Eltmann GmbH

Thomas Neugebauer takes over the management of Quality Assurance at KUHN Präzisionsspindeln und Gewindetechnik GmbH and supports the Quality Assurance team of Präzisionskugeln Eltmann GmbH as Specialist Quality Assurance.

When I joined UMBRAGROUP Germany in July 2022 to take over the management of quality assurance at Kuhn, I already recognized the great potential for optimizing and restructuring quality assurance at Kuhn. It is certainly a big and challenging task that awaits me, but I found a very committed and flexible team at Kuhn with a great willingness to change, which provides me with excellent support. All my new colleagues, both at Kuhn and at UGP, are very helpful and collegial. In both companies, the high motivation of my new colleagues is outstanding. I look forward to a long and successful collaboration.

I had my first contact with quality assurance back in 1990 at my old employer, where I worked for 32 years. During this time, I held various positions in quality assurance and in the production of bearing components for aircraft engines and aerospace applications.

In the early years, I worked as an inspection specialist in quality assurance and was mainly responsible for the visual and dimensional



Thomas Neugenbauer, Quality Assurance Manager at KUHN Präzisionsspindeln und Gewindetechnik GmbH and Specialist Quality Assurance at Präzisionskugeln Eltmann GmbH

inspection of high-precision bearings and bearing components. Within the scope of this activity, I was involved in various projects, such as space bearings for the European launcher Ariane 5 and the Space Shuttle.

In 2001, I moved within the company to the Diagnostics & Repair (MRO) section, where, based on my many years of professional experience, my expertise and my commitment, I also accompanied the position of deputy section chief for the section from 2006. In addition to the position of deputy technical manager, I was also employed here as a technologist from 2012. Among other things, I was responsible for investment projects (machine procurement, tool optimization) as well as the optimization of production processes, reduction of throughput times and improvements

of individual workflows.

In 2013, I moved to quality management as a specialist. My core competencies here were in the quality management system, audit system & auditing, supplier support, processing of customer complaints.

Conclusion

Quality assurance is designed to ensure the established standard of processes and procedures as well as products. As an important element of quality management, quality assurance helps to intensify the effectiveness of the organization as a whole.

“All employees in the Company are responsible for Quality Assurance“



KUHN

maintenance

department

Daniele Mercuri
Facility & Maintenance KUHN GmbH

As of June 2021, thanks to the team at Foligno, KUHN Präzisionsspindeln und Gewindetechnik GmbH was able to open its Maintenance department.

Before then, machines were serviced only after a failure, leading to major losses in production capacity. Together with this department, TPM (Total Productive Maintenance), a process that aims to lower the number of machine downtimes, was also introduced.

TPM is a preventive maintenance system that aims to achieve the maximum company efficiency by reducing failures, slowdowns, and poor quality. In order to be able to constantly improve, it is important, first of all, to monitor and measure. For this reason we created a ticketing system for

every department, to identify machine stoppages as quickly as possible. Afterwards, we added indicators to provide greater detail:

- » MTTR (Mean Time to Repair): The mean time necessary to repair a system (technical or mechanical). Measurement of the time does not stop until the system is fully up and running again.
- » MTBF (Mean Time between Failures): The mean time between failures, essential for measuring the availability and reliability of the system (technical or mechanical). The higher the time between failures, the more reliable the system.

Every stoppage is then recorded digitally together with the costs incurred for spare parts or support from outside companies.

By keeping an eye on these indicators as well as the costs, it is possible to devise criticality analyses, which are fundamental for detecting which machines are more at risk of failures than others. This way it is possible to make targeted investments in order to guarantee greater reliability of the machines for production. Thanks to all this, we were able to see the first results immediately. We saw a 40% reduction in downtimes and 60% in MTTR compared to last year.

With regard to the facility, we put many of the company's key systems, which had been idle or inadequate for a long time, back into operation. One of these, for example, was the cooling system, which is fundamental for maintaining a constant temperature in the departments, and thus guaranteeing a proper production process. The Maintenance department also supports the company Safety. Constant monitoring is scheduled



Daniele Mercuri at the KUHN Präzisionsspindeln und Gewindetechnik GmbH headquarters

for all the systems present in the company so as to guarantee optimum working conditions. For this purpose we work every day with outside companies that support us in the various activities.

The department's goals for the coming year are: to further reduce the number of failures; to extend TPM to other machine families; to identify new strategic suppliers for the precise, punctual delivery of spare parts; to schedule periodic maintenance operations for the facility; to organize a spare parts warehouse within the company with a reordering system (in the event of stock shortage) for the most crucial machines.

We strive constantly, every day, to improve and always be FIRST.

Electric propulsion according to UMBRA GROUP

Moreno D'Andrea

Electrical Design Manager, Research Centre
Manager UMBRA GROUP SpA

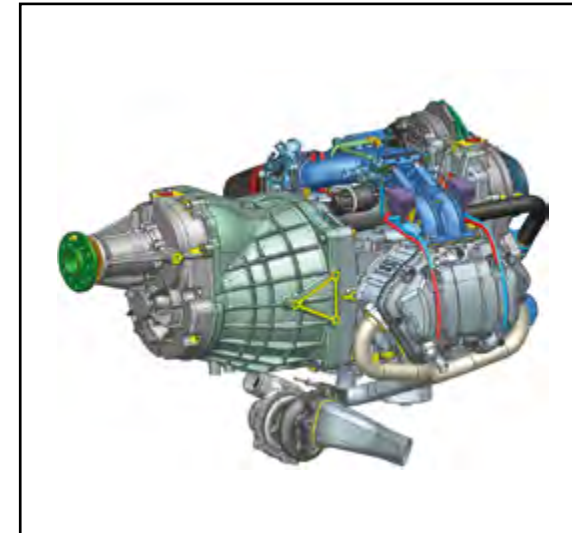
The rapid change we're going through in the aerospace sector toward electrification and electric propulsion is mainly due to the need to limit and reduce the CO2 emissions caused by fossil fuel combustion. The technological innovation has also been included in NASA's roadmap, with a plan to start the development process with applications on short-range light aircraft.

With the DIPROVEL ("Dimostratore tecnologico di un sistema di Propulsione ibrida aeronautico per applicazioni su VELivoli leggeri" - Technological demonstration of an aeronautical hybrid propulsion system for applications on light aircraft) project, UMBRA GROUP is responsible for the development of a driver and a high power density electric motor. The new products that will be developed will be combined and integrated in a mixed configuration with the combustion engine of a light aircraft.

The role taken on by UMBRA GROUP in this program is one of great responsibility. The new system designed and produced is, in fact, the beating heart of hybrid propulsion. Any detail overlooked, or dealt with inappropriately, would have a significant impact at this historic time of change and development in aeronautics.

The dimensioning of the propulsion system uses a typical flight mission as reference. During the take-off and cruise phases, it is envisaged for the electric machine to be used to function as an electric motor while, during the landing phase, the electric machine functions as a generator to recharge the battery pack.

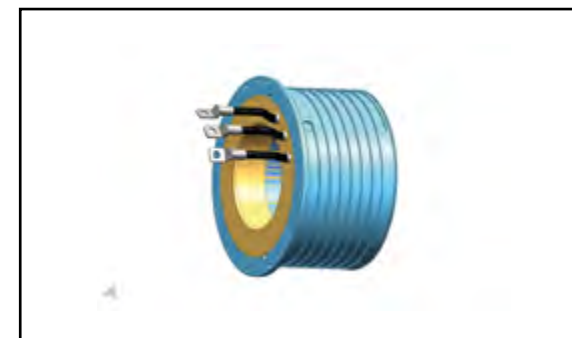
In order to achieve the ambitious goal of the research project, UMBRA GROUP, which has been specializing for years in the design of electric motors, analyzed and studied the system specifications in detail. The resulting dimensioning focused on the optimization of the electric machine, so as to obtain both a maximum performance value and an overall weight reduction. These results offer the benefit of having a propulsion system with a lower energy



View of the position of the electric motor; image courtesy of CMD S.p.A.



View of the installation of the CMD22 hybrid engine; image courtesy of CMD S.p.A.



Detail of the electric motor developed by UMBRA GROUP

requirement, and thus the possibility to use a battery of compact size.

In literature there are various ways to produce a hybrid system. In this project, the configuration used for combining the electric motor with the combustion engine is a parallel one. Compared to a serial configuration in which the combustion engine is not connected directly to the propeller, this configuration envisages the coupling of both the motor and the engine, with the possibility to receive power from both and be able to regenerate via the electric motor, while the combustion engine provides the propeller with mechanical power. The propulsion system will undergo tests on the ground with the final aim of demonstrating its convenience over a traditional system, with superior performance capacity in terms of efficiency, energy consumption, polluting emissions, and noise.

At present, the project is in the part production phase. The next step will be the integration of the control system with the electric machine, to be followed later by the concluding bench characterization to test its performance and integration. The end of the activities is envisaged for mid-2023.

With the experience gained thanks to the DIPROVEL project, combined with the knowledge acquired through other ongoing development projects, UMBRA GROUP is gaining more and more expertise for designing the propulsion systems of the future. We're ready to bring about an epochal technological change, playing a fundamental role for the future and upcoming propulsion systems of the sector, in particular for Urban Air Mobility.

Looking forward to having an UMBRA GROUP propulsion system in flight and in mass production as soon as possible, I send you my best wishes for a peaceful and happy holiday season.

We are “gold”

Recognition of “Merit” for UMBAGROUP’s galvanic processes

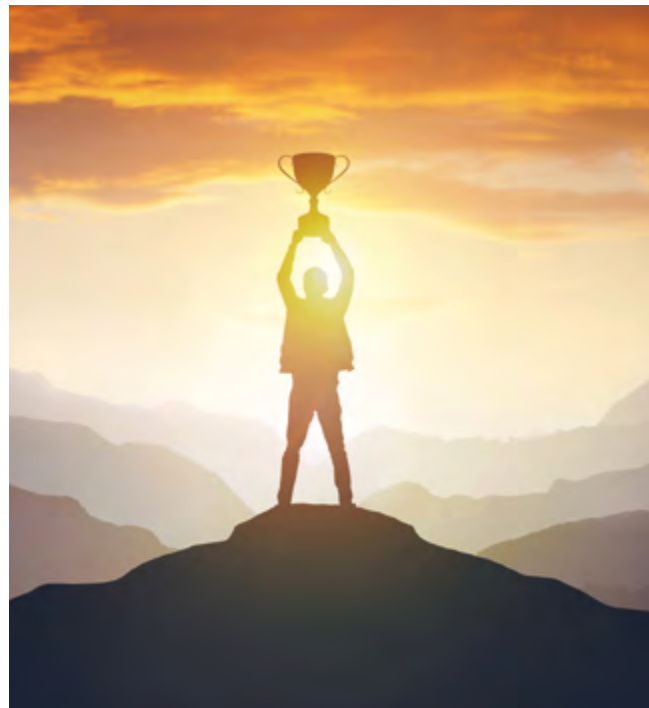
Leonardo Bianchini

Team Leader Supplier Quality Assurance & Special Processes EN4179 NDT Level III UMBAGROUP SpA

UMBAGROUP’s galvanic processes were recently honored with the “NADCAP Gold Merit” award, which goes to organizations that are able to maintain high levels of compliance with international aeronautic standards.

NADCAP (National Aerospace and Defense Contractors Accreditation Program) is a global cooperation program involving the most important companies operating in the aerospace and defense sector, known as Primes: companies like Boeing, Airbus, Collins, etc.

The purpose of the NADCAP is both to manage a common approach to accrediting special processes, and to promote the continuous improvement of the aerospace sector, supporting shared auditing standards and criteria all over the world. Before the advent of NADCAP, companies of the aerospace sector monitored the activities of their suppliers, verifying directly the compliance with their process requirements. Considering that the processes offered by the suppliers to their customers were often similar, when not identical,



the customers’ requirements were equivalent. As a result, there was a great redundancy of audits and an increase in the work load, which brought absolutely no added value. For the major Primes of the aerospace sector, auditing their suppliers in these terms doubled their work, with superfluous audits and management processes and, ultimately, higher costs without any added value in return.

Here at UMBAGROUP, an audit was conducted last May by the PRI (Performance Review Institute) precisely in the Galvanic department, which also involved the Chemistry and Technology



The Quality Aerospace team, the Galvanic department, the Chemical Laboratory, and the Technological Laboratory after receiving NADCAP’S “highest merit status” for our plating process

“
The outcome of the audit was particularly positive, with no “major findings” reported, leading UMBAGROUP to receive the “NADCAP Gold Merit” award.
”

labs. The outcome of the audit was particularly positive, with no “major findings” reported, leading UMBAGROUP to receive the “NADCAP Gold Merit” award. This award is given after passing several consecutive audits, always with the same level of excellence.

UMBAGROUP, in agreement with company Management, decided to celebrate this recognition together with the whole team, taking the photo shown here.

This article provides the welcome opportunity to congratulate once again all the members of the team who, through their hard work, made it possible for UMBAGROUP to achieve this important result.

During the coming months there will be further challenges to be met in connection with the NADCAP, but we are certain that this “Gold Merit” is an incentive for further successes!

Industrial Line *Quality*

Luca Bossi
Manager Quality Industrial UMBRAGROUP SpA

During the second part of this year, the Industrial Quality team was involved in the continuation of the activities and projects started during the first half.

In particular, the ISO 9001 (together with the EN 9100) audit conducted in July was passed with positive results, leading to the renewal of UMBRAGROUP's certification.

Quality's positive KPI (Key Performance Indicator) trend continues, with all the indicators in line with the company target and the roadmap focusing on reducing defects (Zero Defect approach).

In the Bearings line, the project to increase the corrosion resistance of products for harsh environments and climatic conditions, and involving Industrial Quality, Production, and a Premium customer of the sector, drew to a close. It should be remembered that the project falls within the framework of a 6-Sigma activity of the customer, and involved the whole chain, from production, to logistics, to the use of its products by the end customer. The project ended on a very positive note, to the customer's full satisfaction.

Also for the Bearings line, the approval process for the special internal phosphating of railway bearing cages by the same customer with whom the above-described project was carried on, was begun and is now in the finalization phase. For the qualification activities, the Quality team members collaborated with various other teams, such as: Materials and Processes, Special Processes, Engineering and Environment, Health and Safety. The customer's final audit at UMBRAGROUP also ended well.

The activity on the automatic control systems that facilitate the visual checks made by the operators is ongoing. In particular, an examination is being made of the optical recognition systems using cameras that permit intercepting any defects in the bearings production process. With these systems, and with a single framing of the piece to be analyzed, it's possible to combine and speed up a series of checks that today are made separately by the operators. The optical recognition systems also make it possible to store the images of the pieces checked, making them available to customers even years later. This aspect is important especially for those products with extreme and particular

applications, in such sectors as railway, energy production, etc., in which traceability is an essential supply requirement.

In the Recirculating Ball Screws line, Industrial Quality, Engineering, and Production are working together for the validation of the effectiveness of new measurement instruments to improve process efficiency, especially with regard to assembly. Validation is done through the use of typical 6-Sigma methods, such as, for example, Gage R&R (gage repeatability and reproducibility: measurement system analysis) and ANOVA (analysis of variance) which make it possible to verify, respectively: the influence of the measurement system on the total variance observed between the parts analyzed, and the contribution of each factor of the process to the observed total variance.

On the basis of the different contributions of each factor, it is thus possible to work on those which are actually important (vital factors) in order to reduce more and more the variation of the production process, compared to factors which are, instead, negligible (trivial factors). Each new system is also



Demonstration of automatic process controls using optical systems in UMBRAGROUP

considered in terms of costs and benefits, so as to assess its return on investment when in operation.

Making the most of the versatility of the Industrial Controls Team, the training activity continues, especially for the reception control staff (bearings, screws, and electromechanical actuators), in order to guarantee the total support of the supply differentiation activity within the framework of a specific Strategic Purposes project. In fact, the differentiation of the supplies is accompanied by an increase in their checks as they come in, in order to intercept in advance any noncompliant parts and safeguard production from delays and inefficiency.



Congratulations

New hires

UMBLAGROUP SpA

Bacci Carla
Ballesi Riccardo
Batori Diego
Battenti Fabio
Becchetti Cristian
Brandi Vittorio
Bronchinetti Lorenzo
Buono Antonio
Cenci Gianni
Cruciani Marco
Della Porta Paolo
Fiorucci Gianluca
La Bella Nicola
Libbra Francesco
Lombardi Gabriele
Lucarini Lucia
Micheli Francesca
Moretti Eugenio
Nassuato Luca
Ottaviani Gabriele
Paoloni Leonardo
Piermatti Michele
Rustici Andrea
Trovarelli Riccardo

UMBRA CUSCINETTI Inc.

Beens Michael E.
Blanchard Richard M.
Clagett Joseph J.
Donsanouphit Jessica
Glenn Amber R.
Lathrop Sean A.
Lim Marcus S.
Manheimer Christopher M.
Mckee Blake D.
Meak Sokhuntha S.
Nguyen Thi A.
Schmitt Bryan T.
Tuy Bun R.

KUHN GmbH

Curri Antonio
Dill Artem
Miccoli Massimo
Werner Große-Wilde
Tucker Wardel-Antony
Ugur Calik

LINEAR MOTION LLC.

Abbey Daniel
Cabezudo Carlos
Dickerson Daniel D.
Duke William T.
Everts William R.
Girvin Nathan
Kennedy John C.
Mcchesney Lee J.
Mejia Alex
Reagan Eric
Santoyo Iii Raymond
Surface Dion
Thornton Nolan
Turner Jonathan
Williams Zachary D.
Zietz Steven

PRÄZISIONSKUGELN ELTMANN GmbH

Höfler Christian
Holzschuh Dominik
Neugebauer Thomas
Piacquadio Karin
Königer Daniela

Just Married

UMBLAGROUP SpA

Boldrini Sabrina e Pacillo Jacopo
Canfarini Mirko e Tomassetti Elisa
Cecconi Mirco e Prologo Federica
Guidi Gabriele e Martini Catia
Luzzi Alessandro e Cerezo Lucero Anahi
Molica Fabio e Fazio Valeria
Peppoloni Fabio e Gradassi Giada

UMBRA CUSCINETTI Inc.

Rhodes Alex e Shelby

LINEAR MOTION LLC.

Slaven Matt e Bryse

PRÄZISIONSKUGELN ELTMANN GmbH

Neeb Bastian e Katharina

AMCo S.r.l.

Belloco Fabio e Fioretti Michela

Births

UMBLAGROUP SpA

Alcini Tommaso
Cecconi Miriam
Concetti Letizia
Fantauzzi Sofia
Nardi Matilda
Pilli Alessandro
Ruffinelli Francesco
Squadroni Gabriele

UMBRA CUSCINETTI Inc.

Vergara Camila
Vergara Emilio

AMCo S.r.l.

Pergolesi Nicola

PRÄZISIONSKUGELN ELTMANN GmbH

Hoffmann Max



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