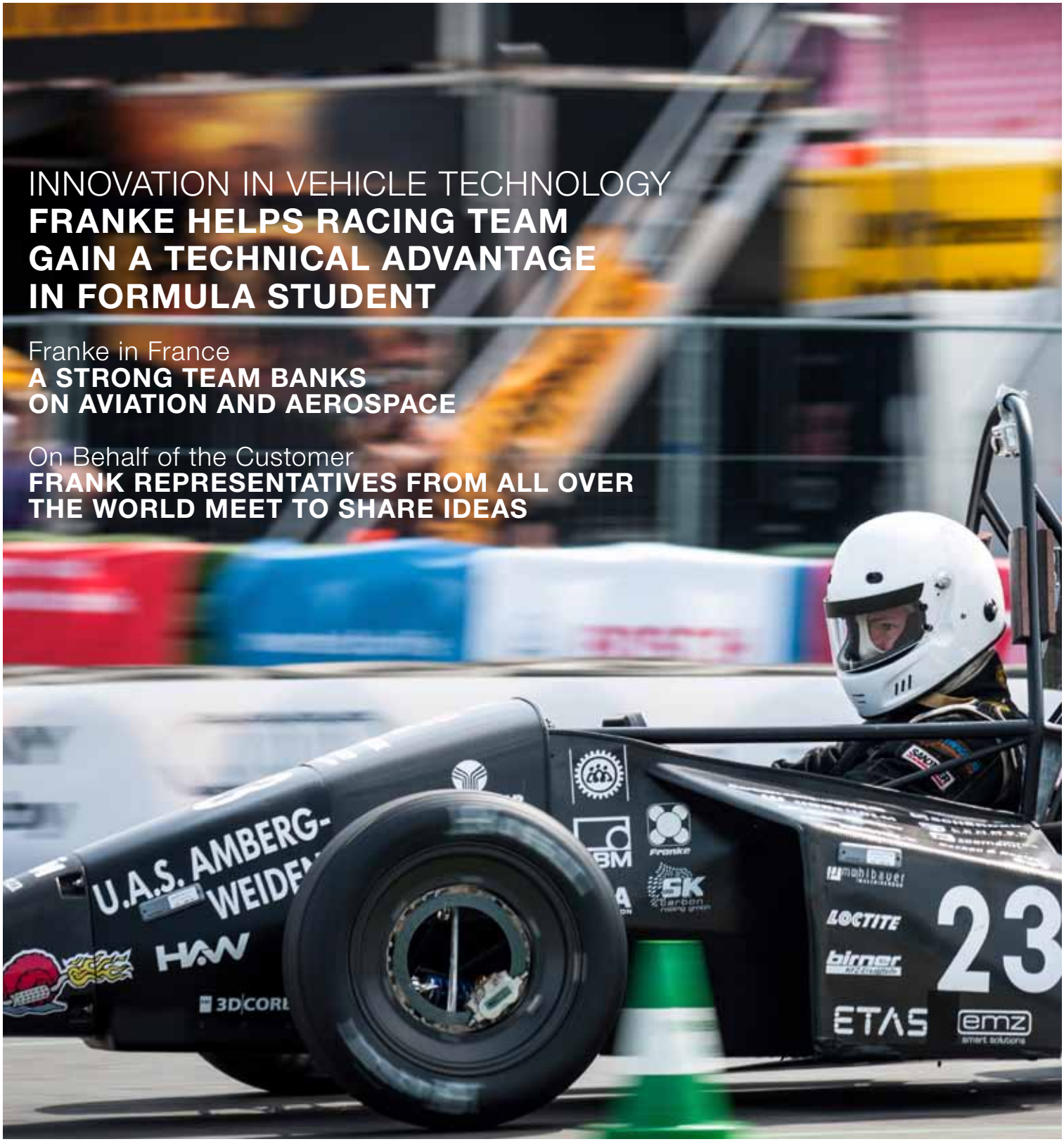
2013 // ISSUE 1

FRANKE INNOVATIV

THE MAGAZINE FOR CUSTOMERS AND PARTNERS



INNOVATION IN VEHICLE TECHNOLOGY
FRANKE HELPS RACING TEAM GAIN A TECHNICAL ADVANTAGE IN FORMULA STUDENT

Franke in France
A STRONG TEAM BANKS ON AVIATION AND AEROSPACE

On Behalf of the Customer
FRANK REPRESENTATIVES FROM ALL OVER THE WORLD MEET TO SHARE IDEAS

^ Managing Director Sascha Eberhard:
“Do you like this new issue?
I would be thrilled to receive your ideas,
wishes and criticisms. Feel free to write to me:
s.eberhard@franke-gmbh.de”

Dear Readers,

we are pleased today to present you with the latest issue of our customer magazine FRANKE INNOVATIV. Recent weeks were dominated by our experiences at this year’s trade fair in Hanover. While at the fair, we succeeded in providing convincing evidence to an international audience of the benefits that Wire Race Bearings have to offer in terms of lightweight construction and free material selection. Numerous visitors who had previously never heard of Wire Race Bearings were thrilled by the design options they provide. It was the first time for Franke at Hanover – and as things stand it most certainly won’t be the last. As you have come to expect, this issue of our customer magazine once more comes with interesting topics on everything to do with Franke.

In racing, **COMPETITION** is written in capital letters. Around 300 university teams compete with their self-developed race cars in Formula Student. This calls for innovative concepts to edge past the competition and to secure a technical advantage in the race. Franke sponsors the Running Snail Racing Team at the University of Amberg-Weiden, providing Wire Race Bearings for the front wheel rim. Read more on this in the title story.

IN DESIGN TERMS, Franke Wire Race Bearings can be integrated in any mating assembly. The front wheel rim in the University of Amberg-Weiden race car is a perfect example of free material selection. At Franke, Arne Jankowski from Marketing and Franz Öhlert from the Development Team were responsible for this project. They provide an account of the background to this work in our expert interview.

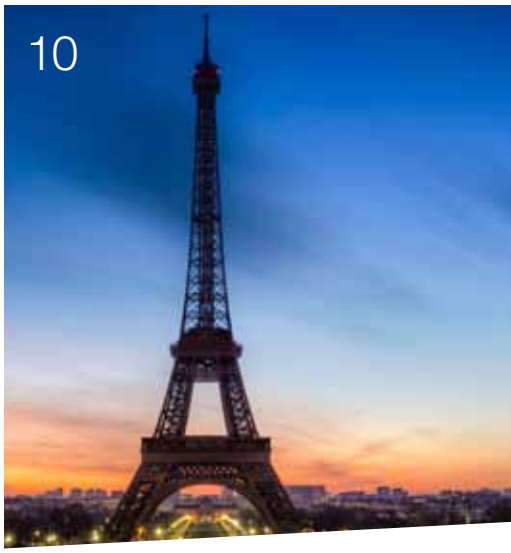
A STONE’S THROW across the border and you are in the country of our neighbours, France. Arriving there, interested Franke customers will encounter the firm Agora Technique and its Managing Director Jean-Jacques Benitah, who joins with his strong team in working the French market for us. Monsieur Benitah has worked for Franke over many years now, and is certainly in the know as to the relevant industries for our products. In June, he will travel to the Paris Air Show to introduce potential customers from aviation and aerospace to what Franke has to offer.
You will get to know Agora Technique in this issue.

CARERS on the ground, these are our representatives from all over the world. As a group they keep closely connected with each others and with their colleagues in the Franke headquarter. Regular product training keep the representatives right on the cutting edge, helping them provide the best possible service and advise you in each specific application.

I hope you enjoy reading this issue, yours

Sascha Eberhard
Managing Director

TITLE PAGE
The Running Snail Racing Team trusts in Franke Wire Race Bearings for its front rim-rider.



Light – fast – no hub
Franke Wire Race Bearings in automotive engineering

Do race car rims really need central hubs? “No” said the students from the Running Snail Racing Team at the University of Amberg-Weiden, simply discarding the notion of heavy components and central wheel bearings. They chose instead the filigree Wire Race Bearings to speed round the racetracks in their nippy little car as part of the Formula Student Tour.

Formula Student is an international design competition, organised for the first time 1981 in the United States, and now held in 49 different countries. Each year, the competition involves a large field of international participants from the United States, along with Germany, England, Italy, Australia, Brazil and Japan. In total, 300 racing teams have come together, 80 from Germany alone.

Space for creativeness

The rules in Formula Student provide the participating students with a lot of leeway to enable innovation. But there are several important characteristics that a vehicle must satisfy in order to compete. For example: a four-stroke engine with no more than 610 cm^3, single seaters with exposed wheels, wheelbase at least 1,525 mm. But there are no limits to creativeness apart from this, and the students at the Running Snail Racing Teams fully intend to use this in order to keep their fireball’s weight as low as possible. The teams now start in the newly created class Formula Student Electric (FSE), using electrically powered vehicles. This is where in future, Wire Race Bearings with integrated wheel hub motors will reveal the full benefits of their design.

Noticeably lighter

The hubless carbon rim on the front wheel is without doubt a spectacular result of the thoughts invested by the Running Snail Racing Team.

The use of lightweight materials and the dispensation with a central module significantly reduce the unsprung mass. The brake disc on the inside receives enhanced cooling and can hence be scaled smaller also, which makes the wheel as a whole noticeably lighter. “This means that we can design the suspension and the shock absorption in a more filigree and lighter style”, says Johannes Braun from the team division suspension/steering, adding: “Additionally, the pivot points affixed to the outer diameter also provide vastly improved absorption of the shear forces”.

The benefits of compact size

The students became aware of Wire Race Bearings while searching for a suitable solution. A filigree aluminium housing was created in cooperation with the Franke engineers, accommodating the bearing rings and offering connection points for the braking system and the carbon rim. The developers profited from the extremely compact mounting space required by the Franke Wire Race Bearings. “We are very happy with this solution”, says Johannes Braun, expressing his thanks for the positive cooperation with the Franke team.

Sponsor for students

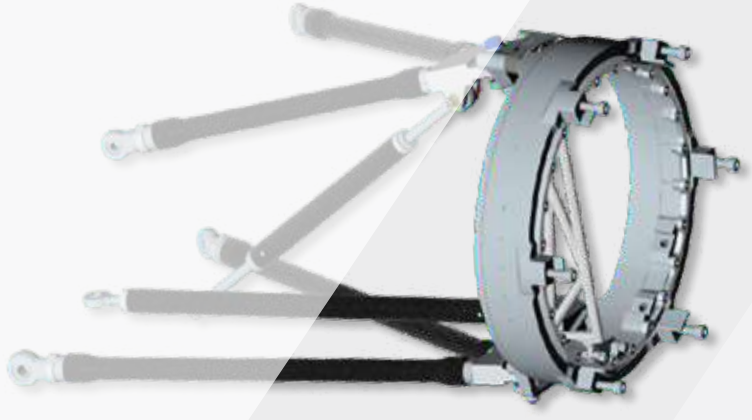
The Franke Development Department looked after the project from the start, conducting numerous tests and analyses. All design resources and the finished bearings themselves were made available to the Running Snail Racing Team free of charge. Hence Franke joins the ranks of the many high-class sponsors in the university racing series.

Technology with role model function

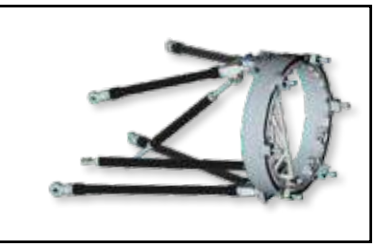
Other teams have since become aware of the hubless rim. The benefits this solution offers are more than just reduced weight and improved wheel control. The direct response of steering and suspension, along with the lower forces impacting on the shock absorbers and chassis, are positive and noticeable features in racing. It is indeed possible that rimless wheels with integrated Wire Race Bearings by Franke will, in the foreseeable future, become standard elements on racing cars.

	Information
Please find further information on the internet: **www.running-snail.de**	

The Running Snail Racing Team was founded in 2004, bringing together various specialist faculties at the University of Amberg-Weiden. Their numbers swelled with time to around 30 members.



Rim-riders offer many different benefits, for instance the bearings mounted directly in the housing, a lower weight, direct force absorption in the suspension and an integrated braking system.



“We reveal our core competence in individual solutions”

Arne Jankowski from Technical Sales and Franz Öhlert from the Development Team spoke with FRANKE INNOVATIV about the race car rim project and about how Wire Race Bearings helped satisfy the particular requirements of this application.

Mr. Öhlert, what went through your mind when your colleague Arne Jankowski first came to you with the idea of rim bearings?
Franz Öhlert (grins)**:** You know, the people at Technical Sales are always coming up with surprises, so my first thought was: interesting – but are they serious?

Were you confident, Mr. Jankowski, that the Development Department would be able to come up with a solution to the enquiry from the University of Amberg-Weiden?
Arne Jankowski: Absolutely. The people there are true professionals with years of experience in adapting Wire Race Bearing technology to individual applications. Wherever you go in the world, Franke is known for its ability to satisfy special requirements. It’s where we get to demonstrate our core competence, fulfilling that kind of individual solution.

What was so special about this specific application?
Franz Öhlert: Apart from the usual suspects you always have with special solutions, for instance the small mounting space, the large open centre and the filigree aluminium housing, this case was also faced with high dynamism and the very rapid change in load ratios.
Arne Jankowski: Let’s not forget that we’re talking about a race car! Its acceleration is pretty phenomenal, also its braking and steering in the bends.

What did you do to satisfy these requirements?
Franz Öhlert: Franke Wire Race Bearings are 4-point bearings; this means they can absorb equal loads from all different directions. The main aspect was to select the cross-section of the wire and the diameter of the balls in such way that the load peaks are safely absorbed. We simulated this in various computer analyses and then verified the results in numerous in-house laboratory tests.
Arne Jankowski (nods)**:** You have to say that the students from the university were very cooperative and really played their part in the overall project. We had engineers from the racing team here with us, and we went through the details together. We believe that close contact with our customers is a major factor in our success when implementing this kind of technology.

Were you able to give the Running Snail Racing Team what they were looking for?
Franz Öhlert: No doubt about that. The front wheel is lighter due to the Wire Race Bearing hub, more rigid, too. The inner brake disc is more filigree and the wheel suspension and shock absorbers were kept leaner. The use of carbon and the optimisation of other units halved the total weight of the race car, compared with its predecessor.
Arne Jankowski: You shouldn’t forget also that this racing series is not just about driving and winning; it’s also about technical innovation. That kind of thing has just as much reputation as winning the race. I do believe that this kind of wheel bearings represents a truly spectacular innovative leap.

Have you seen any signs that this technology is raising eyebrows already?
Arne Jankowski: The Running Snail Racing Team was so kind as to lend us the wheel mount for the trade fair in Hanover. Our Advertising Department put on an eye-catching video in the background; this combination attracted representatives from a large number of competing teams to our stand, all wanting to play around with the Wire Race Bearing rim. It is perfectly possible that pretty soon, we’ll be sponsoring other teams, too. (winks at his colleagues)

It sounds promising! What does the Development Department have to say about this outlook?
Franz Öhlert (thumbs up)**:** No problem for us. Just bring it on!

Film

Take a look at the YouTube video for Running Snail

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Light Bearings for Hightech

This was the slogan Franke used for its successful presentation at the Hanover Trade Fair.

Franke looks back positively on the trade fair in Hanover at the end of April – both in terms of visitor numbers and the new contacts made at the trade fair stand. Franke attended the international industry fair for the first time in the company's history. The trade fair stand was situated centrally in the Industrial Automation section in Hall 16, presenting a selection of cutting edge Wire Race Bearings and Linear Systems, all of which offer the following properties: lightweight design, high dynamism and flexible applications. Franke manufactures customer-specific and individual products used in a wide variety of different industries, for example in medical technology, robotics, packaging, the food industry and in mechanical engineering. The innovative products at the trade fair included lightweight bearings made of plastics, which weigh only a quarter of their steel counterparts, and a hubless race car rim made of carbon with integrated Wire Race Bearings.
The next big fair coming up on the programme is the Paris Air Show in June. The company is looking forward to fresh impulses for business with lightweight bearings in aviation and aerospace applications.

Franke at the PACKEX in Toronto

Stefan Magnusson from Franke Canada presents Wire Race Bearing technology.

The trade show PACKEX was held in Toronto, Canada, from 14 to 16 May 2013. PACKEX is Canada's largest show for packaging technology, material handling and logistics. It is the premier opportunity to make contact with the industry's foremost companies. Participating in this show was a great opportunity for Franke to familiarise a select audience of engineers and designers from the packaging industry with the technology of Wire Race Bearings and the benefits of aluminium Linear Systems made by Franke.
This was an important stage of brand building in North America.

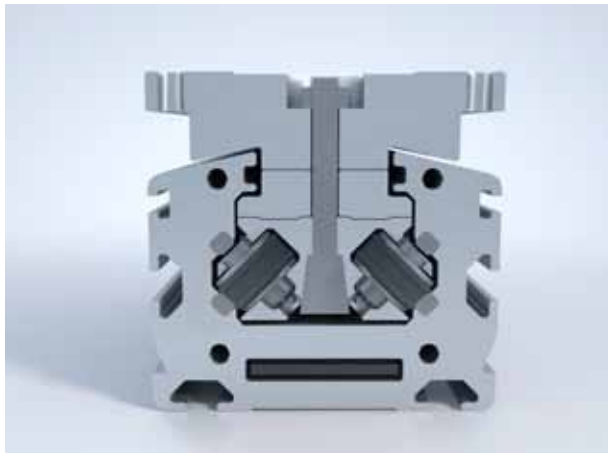
Space for two-meter bearings

The new production building for CT bearings starts operations.

In future, Franke will offer bearing assemblies with a diameter of up to 2 metres. To do this, a new production building was constructed, offering space for the required machines and for the assembly and test facilities. The building was completed at the end of 2012, and the hot phase of the move is currently underway. The highlight so far was the arrival of the DMU 210. This unit noticeably enlarges capacities in machined production, which will equally benefit customers requiring smaller bearing assemblies. Consolidation in CT bearing production is intended to cut idle periods and further enhance manufacturing productivity.

Linear module FTI

>> With inner raceways and a fair price.



The Franke Linear Systems have a new addition to the family. The new linear module type FTI enhances the product programme with an integrated toothed belt drive.
The special thing about it: The raceways and roller shoes are fitted compactly and protected on the inside of the module body. The module is motorized by a robust toothed belt that simultaneously closes the aluminium U profile and protects the guide system from dirt penetrating.
The function of the guide rail is based on roller technology, also used in the long-standing Franke Dynamic type linear guides: arranged crosswise, rollers with needle bearings absorb the load and provide persuasive absorption in their rapid response behaviour during highly dynamic movements. The number and arrangement of the rollers are variable and can be adjusted to suit the respective load ratios.
All in all, the new linear module FTI with inner raceways is a light and fast motion component at a very fair price.
The new linear module FTI will be available from the fourth quarter of 2013.

Slim bearing LEG 8

>> Wire Race Bearings in a new dimension.

The LEG 8 is a consistent redevelopment of the Wire Race Bearing technology. In the LEG 8 two race wires are combined into one. Instead of the four race rings you find in conventional Wire Race Bearings, the LEG 8 has just two. The 4-point principle is maintained by the special profile of the raceways. This makes mounting and adjustment just as simple as for conventional slim bearings with gains in load capacity and rating.

The advantages of the LEG 8
- Compact design
- Simple assembly
- High load capacity and precision due to 4-point principle
- Available in any diameter from 5.5 – 30”
- Up to 50 % cheaper than conventional slim bearings

Franke in France

Agora Technique familiarises French compatriots with technology made in Germany

Franke Wire Race Bearings and Aluminium Linear Systems are available throughout the world. In France, the firm Agora Technique represents Franke. Managing Director Jean-Jacques Benitah and his team of back-office and field sales agents criss-cross the country to market the Franke brand and to acquire new customers.

Steel landmark

The Eiffel Tower was constructed in Paris between 1887 and 1889; it was intended as an entry gate and a vantage point for the World Fair, erected to mark the 100th anniversary of the French Revolution.

The facts:
Overall height: 324 m
Builders: Maurice Koechlin, Gustave Eiffel
Architect: Charles Léon Stephen Sauvestre
Opening: 31 March 1889
Steps: approx. 1,700
Weight of the steel construction: approx. 7,300 tons
Total weight: approx. 10,000 tons
Vantage platforms: 57.6 m; 115.7 m; 276.1 m
Height of the restaurant: 115.7 m
Current use: Television tower, restaurant, vantage point

Like all of her colleagues from the Agora team, Elodie Vincent received extensive technical training at the Franke headquarters in Aalen. The technique is what really counts: and this is what Jean-Jacques Benitah uses in the French ball game pétanque. The 58-year-old has been associated with Franke since 1984; his firm at the time was called Tecnimatic. In 1994, Jean-Jacques Benitah (large image on the left) and his partner Carlos Couso (large image, fifth from the right) founded the firm Agora Technique, whose team throws its weight behind Franke in France.

Agora Technique has many years of experience in consulting and marketing services for mechanical components. In addition to Franke Wire Race Bearings and Linear Systems, the company also offers items by other manufacturers. This produces a carefully streamlined portfolio of drive and control elements. Spindles, rollers and aluminium profiles are offered next to Wire Race Bearings and linear guides. This enables the Agora sales staff at all times to offer customers precisely the right solution from the entire construction tool kit of components. In this, the company places its trust in synergy effects, believing that this extensive range will provide a broad foundation for catering to customer needs.

The Agora Technique headquarters are located roughly 20 km south-east of Paris – in the small town of Alfortville in the heartlands of France. Technically experienced field sales agents support the other regions, ranging from north to south and from east to west. They work independently to look after their customers, building width to enhance the Franke brand awareness. An extended back-office team consisting of young, dynamic employees keeps the lines glowing to the Franke headquarters in Germany. There are special contact persons in sales and marketing departments in Aalen, deployed to cater to the needs of their French colleagues, to prepare offers, to accept orders and to monitor consignments. This means that the team around Jean-Jacques Benitah has their hands free to acquire new customers and projects.

Agora Technique works along many different channels to enhance the Franke brand awareness and to further the cause of branding as a whole. In this, the industries that are traditionally strong in France are given particular focus: the automobile industry with its numerous suppliers and also safety engineering. “We place ads in specialist journals, publish press reports and send out e-letters to our customers”, says Julien Compain, responsible for marketing at Agora. Technical input and proper CI layouts come from the Franke advertising department. At the same time, the team in Aalen do their best to ensure that Agora advertises the Franke brand within an exclusive framework.

A special highlight is scheduled this year for the middle of June: trade fair participation at the Paris Air Show, which Franke will attend for the first time. The aim is to establish a stronger foothold with customer-specific lightweight bearings in the sectors of aviation and aerospace. The idea to take part in the trade fair came from Jean-Jacques Benitah: “I though it would be a good opportunity to familiarise the technology of Wire Race Bearings in very important industries within the French market. The Paris Air Show is not without reason the world’s largest aviation fair.” Franke was only too pleased to accept this offer. The trade fair stand has already been designed and the team at the Aalen headquarters will be on site during the trade fair week to support the Agora crew. They intend to work together to acquire new customers, to discover new possible applications and to drive forward the Franke brand.

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Lightweight

Safety technology

Laser control for aircraft protection

Requirements
Bearings with a high degree of rigidity and the highest levels of precision are needed for use in aircraft defence systems. In this area of application, laser beams are deployed in order to deflect hostile missiles. The bearings must be capable of compensating thermal expansion in the event of rapid temperature changes in a range of –50 and +70° Celsius and also severe vibration.

Solution
Franke lightweight bearing assemblies as aluminium angular contact ball bearings with a diameter of 90 mm.

Customer benefits
The bearing assembly LDZ has a radial and axial run of 0.03 mm. The light aluminium design achieves a weight reduction of 65 %. The bearing load, rigidity and precision of the bearing are defined by the race rings. The outer ring is movable in order to provide optimum compensation for the incidence of thermal expansion. The special bearing has an impressively low weight and precise movement, despite the extreme conditions.

Motorized directly

Vehicle technology

Vehicle rim with direct drive

Requirements
In the development of a directly motorized wheel, the weight of the unsprung masses should be kept as low as possible. The motor should be integrated in the installed bearings. It is also important to absorb all loads arising from the dynamic driving.

Solution
Franke Wire Race Bearings with integrated motor.

Customer benefits
Franke Wire Race Bearings can be directly integrated in the mating structure. This in turn enables the use of lightweight materials in the rim such as aluminium or carbon. The deployment of two Wire Race Bearings as 4-point angular contact bearings helps smoothly absorb any incidental forces. The integrated direct drive works reliably under any conditions of use. The customer receives the entire system from one source.

Non-corrosive

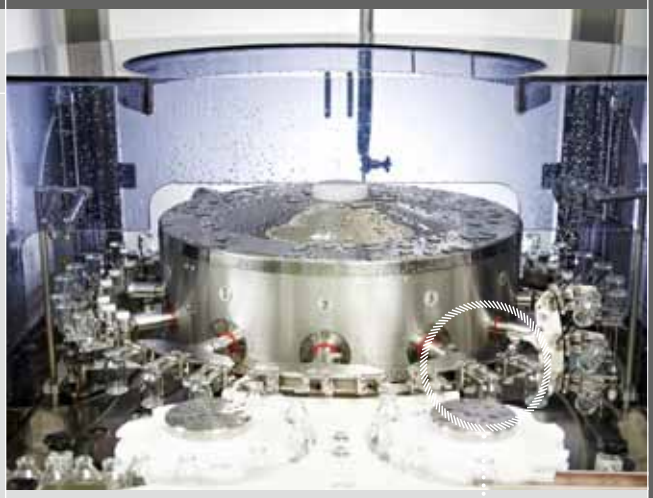
Packing machines

Beverage bottling systems

Requirements
Precise filling volumes of still water are filled in plastic bottles with the highest standards of microbiological and hygienic safety. The centrepiece of the machine is a filling pipe whose inlet aperture possesses a diameter of between 40 and 100 mm, depending on the size of the bottling system. The carousel is filled via the column. The column is fitted with one locating and one floating bearing, respectively. The bearings used must be lubricant-free and also non-corrosive.

Solution
Franke bearing assembly in non-corrosive design as angular contact ball bearings.

Customer benefits
The bearing assembly is designed to be suitable for food in a non-corrosive version with bearings made of oxide ceramics. The bearing operates with revolutions of n = 10 R/min and possesses a radial and axial run of 0.03 mm. The bearing absorbs axial forces of 1,500 N emanating from the filling pipe. Germs are killed every 48 hours by heating the components to 130 °C. In order to satisfy the hygienic requirements, the bearing assembly is designed to be lubricant-free, that is it possesses a special lubrication with food industry grease.



Highly dynamic

Mechanical engineering

Flat glass cutting system

Requirements
The production of flat glass is an endless-continuous process. The molten glass, doughy-liquid at 1,100 °C, is continuously directed from one side on to an elongated bath of molten tin; the slightly lighter glass floats on top, spreading evenly like a film. The glass, which solidifies on the cooler end of the bath at around 600 °C, is extracted continuously and cut into panes. In this, the cutting tool is directed diagonally in order to achieve a straight cut in interaction with the flowing glass sheets. The greater the dynamism in the cutting tool, the slighter the diagonal alignment.

Solution
Franke linear motor module FTH Drive with a stroke length of seven metres.

Customer benefits
The high dynamism of the linear motor drive means that the cutting tool can be moved in just a slight diagonal alignment. This saves mounting space and processing time. The glass panes are cut quickly and cleanly. The linear module works quickly, cleanly and almost without any maintenance compared with modules motorized by spindle or toothed belt.

Franke representatives from all over the world meet to share ideas

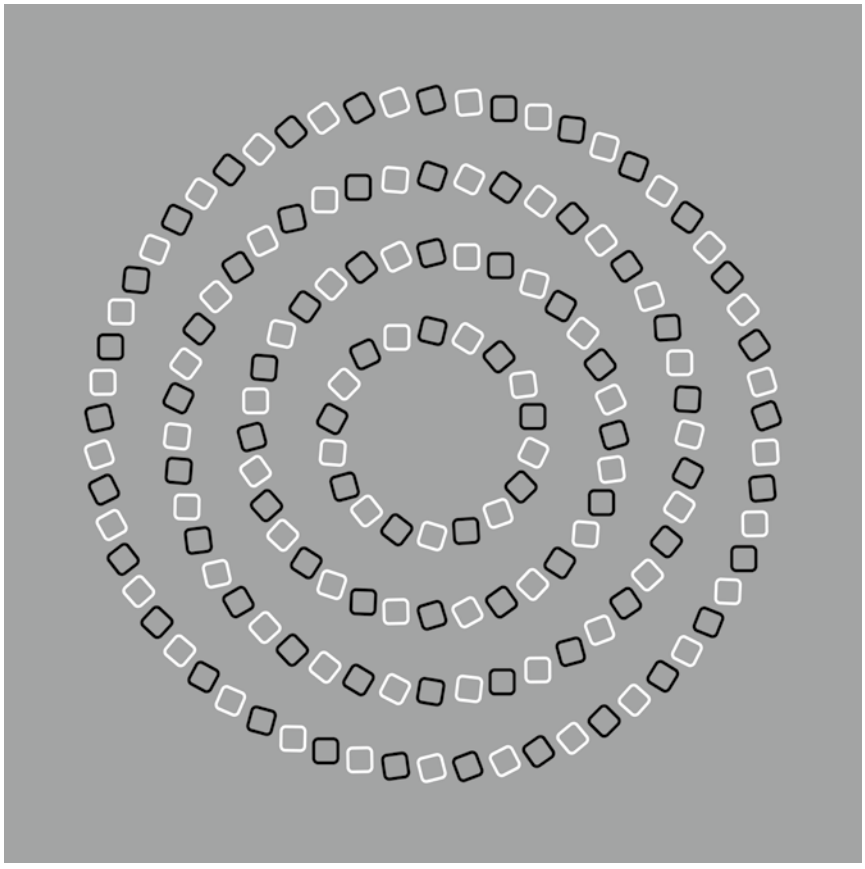
Franke offers tailor-made customer solutions for a wide variety of industries – so the options are just as diverse! The Franke field services team is at the disposal with advice and a helping hand to find just the right version of Wire Race Bearing or aluminium linear module for the specific application.

Franke adapts its products to the individual application in close cooperation with the customer. The whole range of solutions are developed, from design and construction of prototypes through to extensive test sequences. This permits the production of individual pieces and also series. Specialists are located on the interfaces between the headquarters and the customers, providing on-site support and catering to each and every one of the client's wishes. There are representatives for Franke customers all over the world. They are familiar with the product range of Franke Wire Race Bearings and Linear Systems and also the design potential for modifications tailored to the individual needs of the customers. They have their own designated contact within the headquarters, providing whatever information they need whenever it is required.

So they have all there is to offer in terms of special applications, a focus on solutions and a good portion of technical expertise: the carers around the world draw on their knowledge and experience in securing a competitive edge through the use of Franke technology.

The worlds of theory and practice go hand in hand at Franke workshops. Participants receive fundamental insight and practical tips from Franke specialists.

Visits to new production facilities and systems in the Franke headquarters are integral elements of the conferences.



Appearance or reality?

**If you gaze at this image, you see interwoven circles. But is it really true? No!
In truth what we have are four concentric circles. But you don't notice that until you trace the lines with your finger and realise to your own astonishment: there is no spiral. But why is it so easy to mislead people?**

**This optical illusion by Baingio Pinna is created by the arrangement of the squares:
depending on the circle, the squares are either turned more to the inside or the outside – creating the impression that the curvature of the circles is more pronounced and that they therefore rotate into each other. The illusion is enhanced by the selection of colours: black and white form an extreme contrast, effectively competing.**

(Source: Baingio Pinna)

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