INNOVATIVE NORDSTERN SEATING CONCEPT COMES TO LIFE

A collaboration with Grammer AG, Lantal Textiles AG, N+P Innovation Design, and SEKISUI KYDEX

appLab™ designLab™ FSTLab™

SEKISUI | KYDEX

Grammer AG, Lantal Textiles AG, N+P Innovation Design, and SEKISUI KYDEX bring the innovative Nordstern seating concept to life for rail interiors.

WATCH VIDEO

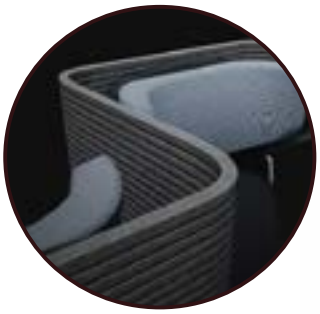
Workshops can bring industry leaders together, guiding them to innovative collaborations, solutions, and concepts that speed train interiors toward an elevated passenger experience.

The Nordstern seating concept is one such example of bringing disruption to the rail interiors industry through innovation and collaboration.

THE IMPORTANCE OF EARLY PARTNERSHIPS

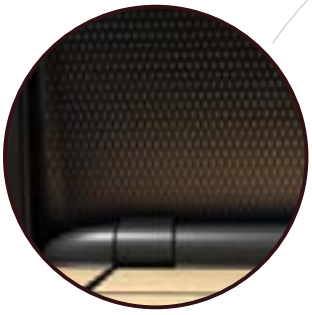
After the first RedCabin Railway Interior Innovation Summit, held virtually in December 2020 due to the pandemic, N+P and SEKISUI KYDEX started working together remotely to bring N+P's rail designs to life. With an aim to establish an iconic presence in the market while considering the various parameters, N+P began utilizing KYDEX® Thermoplastics and the thermoplastic manufacturer's Crystal Cabin award-winning Infused Imaging™ technology within their designs.

This initial partnership eventually led to a pioneering rail collaboration just a few years later. Karyn McAlphin, Creative Design Lead for SEKISUI KYDEX, noted, "Building trust with like-minded companies not only opens the door to future projects but also allows you to achieve remarkable results in a shorter timeframe. We often stress the importance of early partnerships and were delighted to start this partnership early on with N+P."



N+P played a pivotal role in coordinating various disciplines to create unique and authentic solutions for the future.

GRAMMER incorporated state of the art technology like digital reservation notice and check in to take the passenger experience to the next level.



SEKISUI KYDEX innovation labs and Infused Imaging™ technology helped bring the seat components to life through complementary design patterns on sustainable thermoplastic materials.

LANTAL's new MESH seat covers provided superior moisture absorption and breathability to enhance passenger comfort... highest longevity... less waste and less need for replacement.

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WHERE THE INNOVATION BEGAN

Nearly one year later, in October 2021, N+P and Grammer conducted a workshop to identify opportunities for improvement within seating solutions. This collaboration led the two to develop a “Blue Ocean Strategy,” a business approach developed by professors W. Chan Kim and Renee Mauborgne. This strategy focuses on creating a new market space or industry instead of competing in an existing market with other companies (known as a “Red Ocean”).

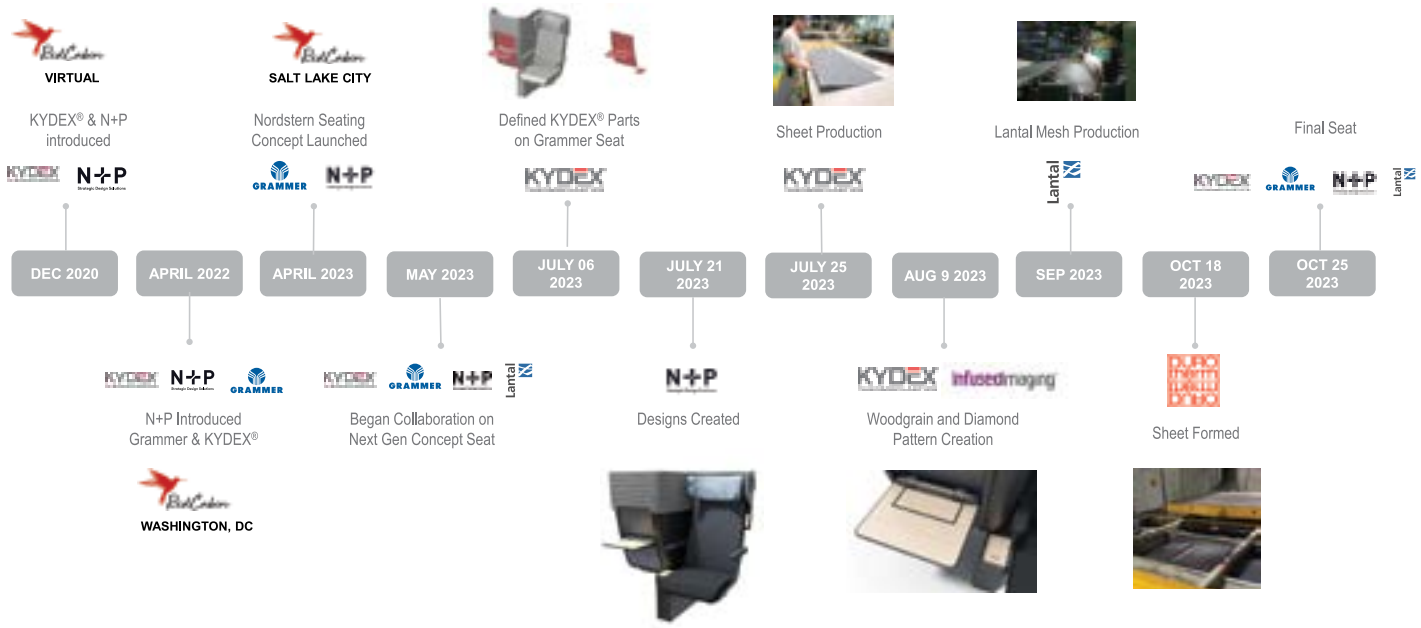
Usually, companies compete in a “Red Ocean,” where they try to outperform each other in an existing market space, leading to intense competition, price wars, and limited growth opportunities. On the other hand, a “Blue Ocean” represents an unexplored market space with little or no competition. Businesses that seek to implement a “Blue Ocean Strategy” focus on innovation, value creation, and differentiation. This can involve creating new products or services, redefining existing ones, or finding new ways to meet customer needs.

The objective is to stand out in a way that attracts new customers and allows the company to set its terms without being constrained by existing market norms. For Grammer and N+P, this strategy was implemented through the idea of creating a new seating concept that embodies Grammer’s design language across the entire product line, with attention to even the smallest detail, ensuring the passenger experience is never compromised.

To distinguish themselves in the market while elevating the passenger experience and delivering enhanced aesthetics, N+P knew it would take multiple collaborative partners to achieve this never-before-seen concept. Recognizing the significant potential in leveraging state-of-the-art materials to achieve the goal, Christiane Bausback, Managing Director for N+P Innovation Design, introduced Grammer and SEKISUI KYDEX at the RedCabin Railway Interior Innovation Summit held in Washington, D.C in 2022. “Partner selection was a large part of creating a holistic solution,” stated Bausback. “We believed the right partners could make a significant difference, bringing the design to life by translating patterns and design DNA from one supplier to the other while keeping the philosophy.”

Using N+P’s evaluation toolkit, the new Nordstern seating concept was presented for the first time to selected operators and OEMs at InnoTrans 2022. The original design concept received a positive response from stakeholders, and Grammer and N+P obtained crucial feedback to enhance the concept even further.

Prior to the 2023 RedCabin Railway Interior Innovation Summit in Salt Lake City, Grammer began construction of the S-Seat prototype while working with N+P on the feedback from InnoTrans to optimize and evaluate the concept internally. In addition, they developed an app prototype that connects to the Nordstern S-Seat and provides customers with a unique and fully customizable experience.



DISRUPTION MEETS COLLABORATION

While each partner brought their own distinctive contributions, N+P played a crucial role in coordinating the various disciplines to create a promising solution for the future of rail interiors. With N+P's familiarity with Lantal's unique and fully customizable MESH seat fabric and their past work with SEKISUI KYDEX, N+P identified Lantal Textiles and KYDEX® Thermoplastics as ideal sustainable material finishes for the Nordstern seating concept. Utilizing the material finishes to achieve a common gradient pattern across hard and soft materials poses an exciting and aesthetically pleasing look that the operator can easily customize.

Shortly after the 2023 RedCabin Railway Interior Innovation Summit, Grammer, N+P, Lantal, and SEKISUI KYDEX began collaborating on the groundbreaking new seating concept. Work quickly began between the partners, and within just six months, the four partners developed and unveiled the design prototype, showcasing it at the November 2023 RedCabin Railway Interior Innovation Summit in Vienna. "Typical projects can take well over a year from the idea conception to the final project. However, through this open collaboration, we were able to create a first-of-a-kind seat within months," said Stefan Wilhelm, Lantal's Head of Markets Ground.

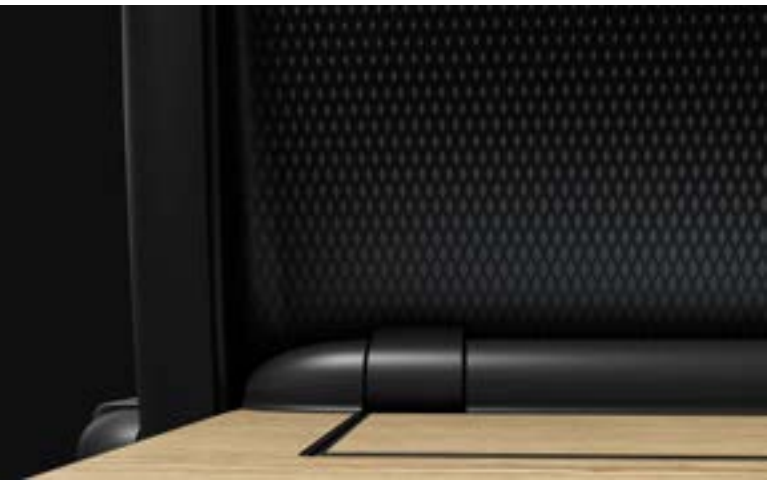
SOLVING FOR PAIN POINTS

Rapid lead times can sometimes create pain points, which can contribute to missed timelines or underdelivered promises. In this case, while the team was able to integrate advanced technology into the seat construction, select the Lantal yarn colour, determine the KYDEX® 2200LT material placements, approve the Infused Imaging™ designs, and construct the seat within just six months, some challenges soon emerged. Transitioning from the knitted textile pattern to a 2-dimensional thermoplastic that could be thermoformed into a 3-dimensional shape without altering the pattern's design took some time to work through initially. In addition, SEKISUI KYDEX not only needed to match the varnished color directly next to the thermoplastic, but they also needed to match Lantal's yarn colour as it had already been dyed to the specifications provided by N+P. To avoid delays in unveiling the Nordstern seating concept, the SEKISUI KYDEX designLab® and appLab™ teams were brought in to assist.

In late October 2023, the partners from Grammer, Lantal, and N+P met with designLab® and appLab™ teams via video conference call for their help in solving a shade variation issue encountered during the initial thermoforming process used for the previously approved master. The designLab® and appLab™

teams were given two weeks to complete the project – a process which would normally require four months. Without adjacent materials to determine how the materials would look in a real-world environment. The teams quickly began making modifications and running test trials. According to Elijah Peltz, appLab™ Specialist for SEKISUI KYDEX, "Typically, we do not aim to match colours with Infused Imaging™ parts during the forming process; however, the appLab™ team was brought in to help reevaluate the colours and make new parts in time for the unveiling."

To match the correct colour and meet the timeframe, designLab® and appLab™ produced five different parts with five variations of colour, and another twelve parts with additional colour variations and Infused Imaging™ artwork. As the Infused Imaging™ artwork was intended for specific placement on the Nordstern seatback, the team had to ensure the colour matched and the artwork was correctly positioned. Becky Gallup, CMF Design Manager for SEKISUI KYDEX, noted, "By bringing the project in-house and utilizing the designLab® and appLab™ resources, we were able to make multiple iterations to quickly find the perfect mold and form, thereby addressing the colour variation and distortion issues."

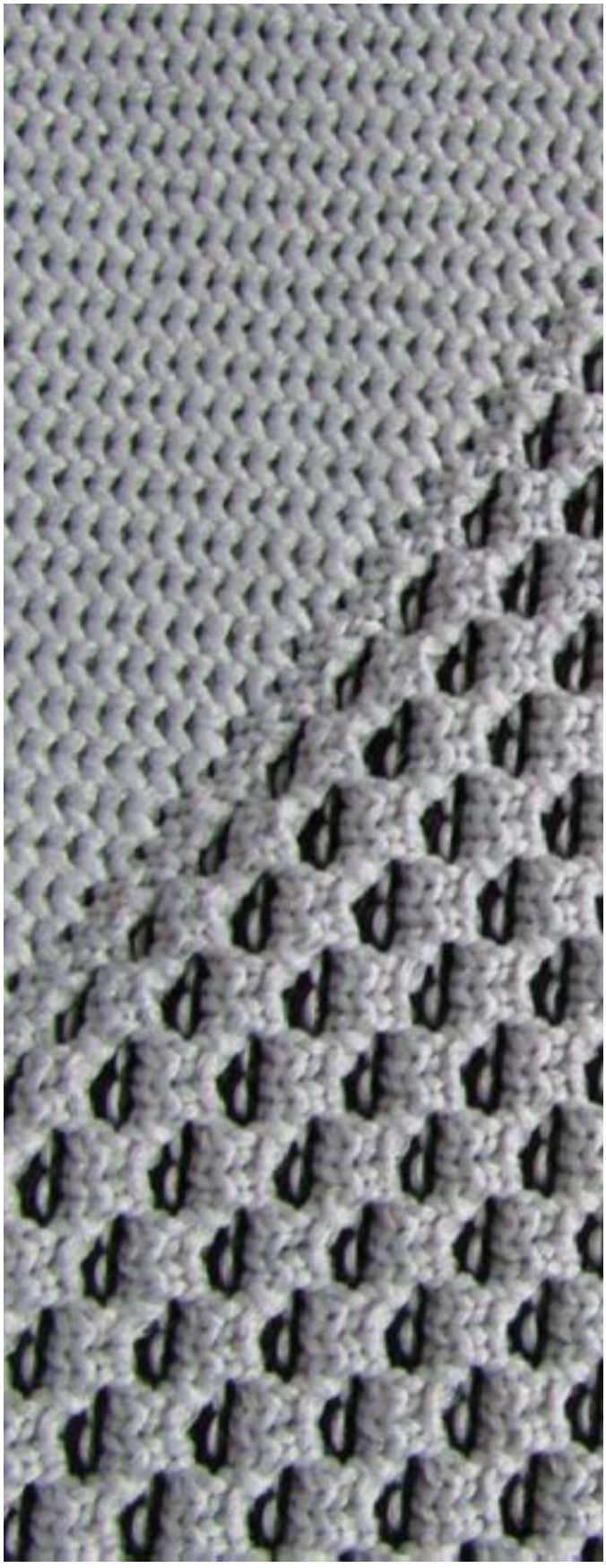


Bringing the project in-house to the appLab™ team allowed for a quicker resolution. Additionally, they were able to document the steps required to create a perfect part. For any typical prototype project, the appLab™ performs all the troubleshooting in-house. They begin scaling up the artwork on the tool, and once the mold or formed part is completed, they transfer the knowledge to support the OEM's chosen thermoformers. This is done via presentation or by going to the thermoformers in person with the necessary tools to demonstrate. Erin Connelly, Sr. Applications Engineer for SEKISUI KYDEX, explained, "In this case, we ran extra grid sheets, which we will send to the thermoformer, to duplicate the sheets made here onto the tooling they made. This allowed us to see the difference between their tool and our tools and ultimately provide the information needed to make the adjustments to the Infused Imaging™ designs."

HOW THE INNOVATIVE DESIGN WORKS

By embracing technology to enhance the overall passenger experience, Nordstern's real-time personalized trip connectivity offers a cutting-edge interface with a customized experience. The system enables passengers to check in, adjust seats, select entertainment options, and receive travel updates — all from the comfort of their seat. By using KYDEX® material featuring a bespoke Infused Imaging™ woodgrain pattern on the tiered tray tables, as well as the console design — complete with a wireless charging symbol, Grammer was able to integrate inductive charging stylishly and seamlessly into the Nordstern seat.

Timo Bauer, Grammer's Vice President of PMS Rail & Road, stated, "When we step onto a high-speed train, we all hope for a warm and inviting atmosphere. The Nordstern interior experience, based on Grammer's modular magnesium seat structure and our partnership with N+P, Lantal, and SEKISUI KYDEX, offers a range of seat configurations, delivering increased comfort, privacy, and safety — all within the same space as traditional cabins. These seats are designed to make public transportation more appealing, offering a unique and adaptable journey." With advanced technology and durable, sustainable materials, Nordstern's adaptable seating concept ensures that train interiors can be transformed into welcoming, modern, and environmentally friendly spaces.



DESIGNING FOR SUSTAINABLE DISRUPTION

Sustainability was not only a crucial component in material selection but is also becoming an increased requirement within the rail industry. While both suppliers brought sustainable solutions to N+P's innovative design, they also contributed an elegant design methodology to minimize weight while maximizing the design and functionality. The Nordstern seating concept incorporates Lantal's fully recyclable seating fabric and durable and recyclable KYDEX® Thermoplastics, significantly reducing weight over standard industry materials. Ruben Bake, Mass Transit Business Manager for SEKISUI KYDEX, noted, "Sustainable design is sometimes tricky for organizations to understand, so we were delighted to engage our designLab® and appLab™ Innovation Centers in a project to enhance the customer experience in an environmentally responsible manner."

Lantal's 100% polyester MESH seat covers promote sustainability with easy recyclability and low maintenance while enhancing passenger comfort with its breathable fiber composition. According to Wilhelm, "The fiber composition of Lantal's new MESH seat covers provide excellent moisture absorption and breathability to enhance the passenger experience while offering the highest possible durability. With significant weight savings and a 100% recyclable material, the MESH seat covers contribute to the sustainable development requirement from Grammer and N+P." Lantal's MESH seat covers provided Grammer and N+P with the design freedom they required while delivering the comfort the passenger deserved.

RECOGNIZING INNOVATIVE DESIGN

In this vision of modern train travel, passengers can enjoy an unparalleled combination of comfort, technology, and sustainability, all without compromising design. During the 2023 Red Cabin Railway Interior Innovation Summit held in Vienna, Grammer, Lantal, N+P, and SEKISUI KYDEX received the prestigious RedCabin Rail Interiors Award for Design Innovation of the Year for the Nordstern seating concept. This collaboration between the four partners is speeding rail into a new era that enhances overall passenger satisfaction with a world of comfort and connectivity, all while utilizing beautiful and sustainable materials.

Grammer's configurable Nordstern seating concept is not only elevating the future of train interiors but challenging the rail industry to adopt a new path based on its Blue Ocean strategy.

Pictured: Stefan Wilhelm, Head of Markets Ground for LANTAL Textiles, Sebastian Wegmann, Business Development Manager Rail and Bus for Grammer AG. Ruben Bake, Mass Transit Market Business Manager, SEKISUI KYDEX, Christiane Bausback, Managing Director for N+P Innovation Design GmbH, and Timo Bauer, Vice President of PMS Rail & Road for Grammer AG.

GRAMMER

N+P Strategic Design Solutions

Lantal

SEKISUI KYDEX

READ THE PRESS RELEASE HERE

SEKISUI KYDEX innovates and creates sustainable thermoplastic material solutions for the next generation of product design.

SEKISUI Chemical's corporate commitment to Speed, Service, and Superiority is realized through the KYDEX® Thermoplastic business model of manufacturing bespoke materials with short lead times in small quantities. This Quick Response Manufacturing (QRM) model at three manufacturing campuses expands beyond thermoplastic sheet. The KYDEX® portfolio also includes injection molding resins, proprietary Infused Imaging™ Technology, integral special effects, unique textures, and custom products and design. The SEKISUI KYDEX appLab™ and designLab® innovation centers are collaborative spaces for clients and customers to bring the supply chain together for rapid prototyping and design development. These spaces are the bridge between engineering and art. More than 300 dedicated professionals in Bloomsburg, PA, and Holland, MI, working with a global network of sales and distribution partners, are committed to delivering more than their customers can imagine.

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