



# In search of the limits of the universe

## Cleanroom crane by Altmann helps with gravitational research

With an extraordinary cleanroom crane, the specialist Altmann has taken on a leading role in a project at the Faculty of Natural Sciences and Engineering at Maastricht University, that is unique in the world.

The initial situation was tricky and the requirements quite demanding. But who would expect that the construction of a cleanroom for a gravitational wave observatory to explore the inner working of the universe would come with trivial requirements? After all, a kind of scale model for the Einstein Telescope (ET) is being built as part of the „ETpathfinder“ research project under the direction of Professor Stefan Hild. This in turn is a deep-frozen, triangular underground laser detector in the planning stage, with three 10 km long arms, that will theoretically be able to explore the universe back to the Big Bang.

The „ETpathfinder“ as a test system is currently being built in a former transport hall in Maastricht, which has been extensively converted into a cleanroom with a low-vibration floor over the past few months. According to experts, this research project will become a valuable infrastructure for further research on gravitational waves and the technology for their detection.

So this is not a small thing that has been planned here. And nothing where project-delaying breakdowns should occur.

The Altmann company from Albaching in Bavaria, which specializes in cleanroom cranes, quickly came in and implemented an im-

pressive custom-made system within a few weeks: 22-metre span, a twin hoist with two extremely precise, fully synchronized hoists that are connected as master/slave and provide a lifting capacity of 2,000 kg each.

### Reaching the limits of physics

Much to the surprise of the Maastricht researchers, Altmann solved the challenge of moving a crane of this size into an already completed cleanroom by using a split bridge girder with an assembly joint. For the two company directors Achim and Robert Altmann, however, this was nothing that caused them sleepless nights. Following their motto „Only physics shows us the limits“, they and their staff had already shown in another project that their solutions exhaust all options in the customer's interests. With two 30-tonne cleanroom cranes, each with a 30-metre span, they had demonstrated that even parts of such a mega system can be brought into a cleanroom, be assembled and put into operation on site, taking hygiene requirements into account.

In the Maastricht project, the crane will be initially used to bring the components for the ET test system and the entire laboratory equipment into the ISO 8 cleanroom. The crane, on the other hand, was designed for ISO 6. It will later be used to carry out the necessary





modifications to the experimental setup in terms of load. The flexibility and precision of the two hoists with a load capacity of 4 tonnes will undoubtedly prove useful here. Because when changing the experimental setups and the necessary research equipment that has to be assembled and disassembled, it is mostly unique items that must be connected or separated very precisely and slowly.

In this project, as Robert Altmann emphasized in an interview with Reinraum online, the company's high level of production depth and the comprehensive range of services have proven to be a blessing. It would never be possible to keep to such a tight schedule if they had to rely on suppliers or subcontractors. In fact, the Altmann company does (almost) everything itself, from planning, structural analysis, mechanical and electrical design through controls, programming and commissioning of the entire software, to the complete production including gears and the final approval by an expert. „We offer cleanroom technology from start to finish,” says the company boss with a sense of pride.

### Self-set high standard

Altmann cranes are also something special from a purely technical point of view. First of all, there is the flat construction height which allows using the given room height optimally and which also saves a lot of installation space in Maastricht. And there is essentially the high standard for cleanroom cranes set by the company itself, which acts as a benchmark in this market segment. After all, it is no longer enough to build a cleanroom crane in such a way that it meets the requirements of ISO 146441. Operation, cleaning and maintenance work as well as the retrofitting of components or functions must not lead to contamination either.

That is why Altmann cranes are completely powder-coated and therefore have smooth, scratch resistant and easy-to-clean surfaces. All cables, geared assemblies, screw connections, electrical components, sensors as well as the hoist with electric belt hoist are neatly „packed” in housings. The materials are selected and combined in such a way that wear and outgassing are largely avoided. The duplex load belts are completely maintenance-free, hardly wear and expand only minimally due to a particular combination of materials. Conventional textile belts, on the other hand, first expand measurably in length before the load is even lifted. To avoid wear on the rotating load hook, it is either made of stainless steel or hard nickel-plated, in compliance with DIN 15400.

In terms of lifting capacity, Altmann recently hit the headlines with its world record with two cleanroom cranes weighing 2 x 15 tonnes, but the company also offers smaller versions from 500 kg.

Even if the Maastricht project will essentially be about Einstein's theory of relativity, the success of the cleanroom crane project is already perfect today. Achim and Robert Altmann would hardly have been satisfied with less. Their credo fits in perfectly with the overall concept of „ETpathfinder”: „The cleanroom can tolerate everything, just no compromises”.

We can look forward to seeing what results the Maastricht research project will bring to light with the help of the Altmann cleanroom cranes.

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