Close-up of the SAT VISI-1 profile recognition system.

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The Profile Recognition System Helps New Zealand Company Altus Reaching New Quality Heights in the Powder Coating of Aluminium Profiles for Architecture

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Due to the small market size in New Zealand and customers requirements for large colour range and profile lengths optimized for efficient window and door fabrication, powder coating operations face a complex process with multiple colours and profile lengths. Altus NZ Ltd solved this problem by installing a SAT Cube vertical line equipped with two application booths and the state-of-the-art VISI-1 profile recognition system.

New Zealand, like its "neighbour" Australia, represents a very particular market. The construction business is relentless and the windows/doors industry refers mainly to residential projects, which means very small projects with final customers choosing from a wide variety of solutions and colours. Most windows & doors companies work by "house-lot", a very small order that needs to be processed quickly and with very high flexibility. That is why several companies are deciding to install an in-house coating facility to be able to process whatever order in a very short time. They have a warehouse with raw material, and when they have the

order, they pick the material and coat it on demand. Most of these companies relied on external job coaters or on an in-house horizontal line, but eventually chose to install or replace the horizontal line with a vertical coating line.
This is what Altus NZ Ltd in Auckland did, relying on SAT expertise in the vertical installations for the powder coating of aluminium profiles. At the beginning of 2020, SAT concluded the start-up of the vertical powder coating plant with a twin booths system for the finishing of aluminium-extruded profiles. It represents the second installation in New Zealand after the Cube vertical powder coating compact line built in 2016.

Mark Kennedy, National Operations Manager at Altus NZ.

Altus NZ: the union of two great companies

The word "Altus" means "High". This is the word a leading manufacturer of award-winning window systems and industrial aluminium in New Zealand has chosen to name the new company formed through the union of two great companies: Fletcher Aluminium and NALCO.
Based in Auckland, Altus extrudes and finishes aluminium profiles for its own window systems, as well as for specific industrial customer requirements.
"We are a new organisation with a rich history of providing market leading innovations and business systems for the construction and industrial sectors. Altus stands for height and depth. We believe that by aiming high and digging deep for our customers, we can reach the very pinnacle of our industry," Mark Kennedy, National Operations Manager at Altus NZ Ltd says.
"We are experts in creating aluminium solutions for our customers. We work across a wide range of sectors, from marine, transport, windows and doors, to mechanical engineering and agricultural industries, both in New Zealand and around the world. We provide quality aluminium products in accordance with stringent national and international specifications. Our services include custom extrusions and profile shapes; sheet, plate and coil products, design and manufacture, finishing options in a wide range of colours, both anodising and powder coating. We also have service centres across the country that provide off the shelf extrusion profiles, including: box sections, angles, and sheet, plate and coil products".

The powder coating team of Altus NZ in front of the Cube installation supplied by SAT.

The new vertical powder coating line: Altus' requirements

At Altus, powder coated profiles have historically been produced on five horizontal lines across three plants. With the recent installation of the SAT Cube line in 2019, Altus will see the consolidation of powder coating operations onto a single site. Due to the small market size in New Zealand and customers requirements for large colour range and profile lengths optimized for efficient window and door fabrication, powder coating operations face a complex process with multiple colours and profile lengths.

The key requirements of the line for Altus was to achieve the required capacity through 1.5m/min line speed, fast colour change via a 2 booth system, an expected step change improvement in powder coat surface finish quality, and an increase in powder efficiency.

In addition, due to the geographical location of New Zealand, the time and cost involved in bringing specialist technicians to New Zealand can be prohibitive, so it was essential that Altus could install a line that, following installation and training, they could run confidently with minimal on-site support.

The scope of supply: highly efficient line with state-of-the art technology

Altus specified a 2-booth line to enable effective management of the large number of colour changes required to meet market demands.

SAT supplied its Cube compact vertical line. With small space required, low operating costs and a competitive price, Cube soon became a game changer in the aluminium powder coating market since its launch in 2013. With a conveyor speed of 1.5 m/min, the line features two "V" shaped powder coating booths with high transfer efficiency and 2 vertical self-cleaning walls rotating and cleaning in continuous.

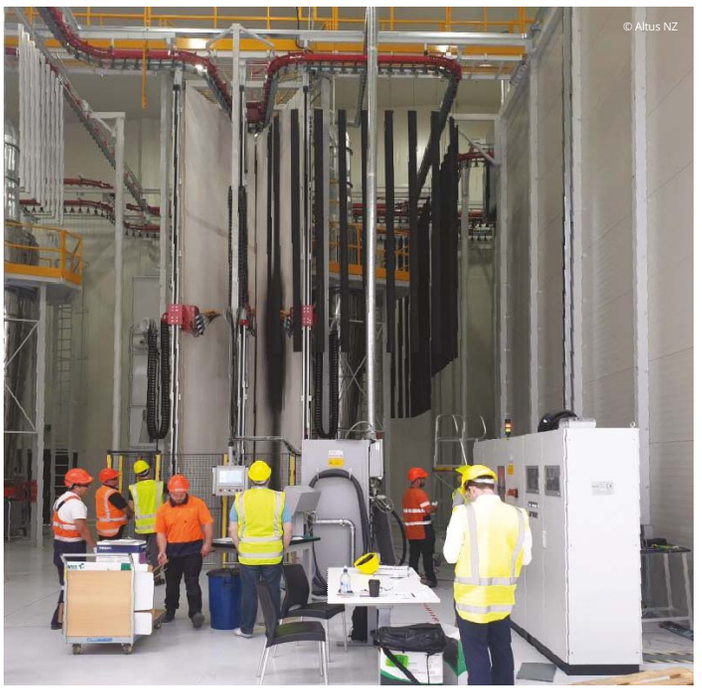
The booths are equipped with two Gema automatic powder application systems, each one consisting of a GEMA Powder Centre, model OptiCenter OC03, equipped with 18 GEMA automatic guns, model OptiGun GA03-P, with angled heads 60° and 18 GEMA dense phase pumps AP01.

SAT designed CUBE to be an intelligent system with the addition of modern technological components that streamline the aluminium finishing process in order to achieve the increasing repeatability requirements of the coating industry. Since then, CUBE has continued to evolve with updated process control and supervision software to provide advanced automation capabilities. Altus in particular, has implemented the Smart Coat vision system, which is able to recognise a profile from its section and automatically control all process settings, thus ensuring a fully repeatable finish. The Smart Coat system will enable

One of the new "V" shaped booths supplied to Altus.

The unloading station with the in-line paint stripping system for hooks.

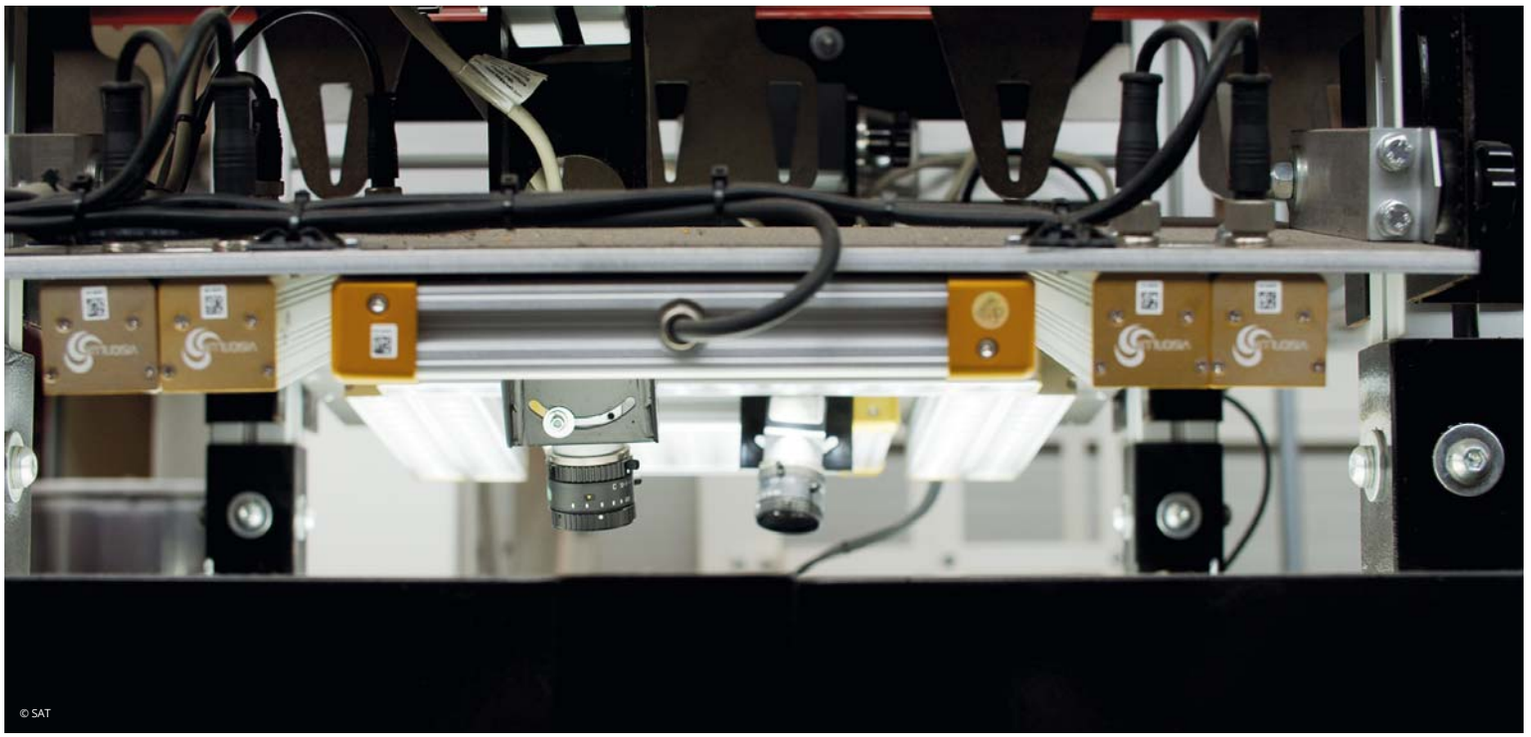
Altus to achieve a level of efficiency and production optimisation rarely, if ever, achieved so far.
SAT line, which also includes in-line chemical jig cleaning, was installed in a purpose built building at the Altus Hamilton site in New Zealand. The installation was supervised by SAT engineers with local installation labour for mechanical and electrical trades. The installation was completed to a high standard, on time and on budget, and commissioning was completed just prior to COVID-19 lockdown.
Following the end of the COVID-19 lockdown, commissioning progressed well and the line is currently in full production on a single 8 hours shift per day, with plans to add a second shift later in the year.



SAT technicians and Altus operators during the start-up of the line in January 2020.

SAT VISI-1 Vision System: how does it work?

As it often happens, the idea of developing the Vision System technology follows a market demand. The need expressed by many players in the sector was to standardize the methods of painting in order to obtain products with a repeatable quality. Likewise, the need to scrupulously control production and the variability of geometries to be processed required equally meticulous planning and business organization.
The vision system acts as a man-machine interconnection tool, so as



Detail of the cameras used by SAT VISI-1 profile recognition system.

to anticipate and categorize the data necessary for the production process. It is a device that allows to detect the profiles hung on the painting line through an images identification process.
Geometry and length of the extrusions are consequently used to associate pre-defined parameters for painting or other phases of the production process.
A camera system snaps some photos of the profile loaded in the line. Then an algorithm finds the most similar model contained in the library, and associates it to the correct coating recipe required. When the profile arrives in the booth, the guns are turned on and off automatically with the right configuration.
The most relevant advantages referred to the Visi-1 are the following:
• Easy scheduling of the painting process;
• Control and identification of the extrusions hanged on the conveyor (recognition);
• Repeatability of process parameters through automatic or manual assignment;
• Automatic adjustment of the reciprocator stroke, powder output and line speed (simplicity);
• Data collection and production statistics for the single profile (traceability).

Goals achieved successfully

"Early indications show that the line will meet all of the expectations. Finish quality from the line has been excellent with a reduction in customer complaints, and powder efficiency has also improved. However, further optimization is needed to meet our targets in this area, although we fully expect to achieve them. The profile recognition system has worked effectively, and is used to ensure the most effective powder application settings. Key to the success so far has also been our partnerships with our powder and chemical suppliers who has also bought significant experience to the table to ensure a successful start-up", Mark Kennedy states. "Altus chose the SAT line based on its technical specifications, but more importantly on the recommendations from visiting a number of similar lines in Australasia. This has proved to be a good decision, and overall Altus is very pleased with the outcomes so far. We invested significantly in our people to ensure we had a well trained and experienced team, able to maximize the technical support provided by SAT, and this has proved to be a good investment as our teams have quickly learnt the necessary skills to run the line effectively".