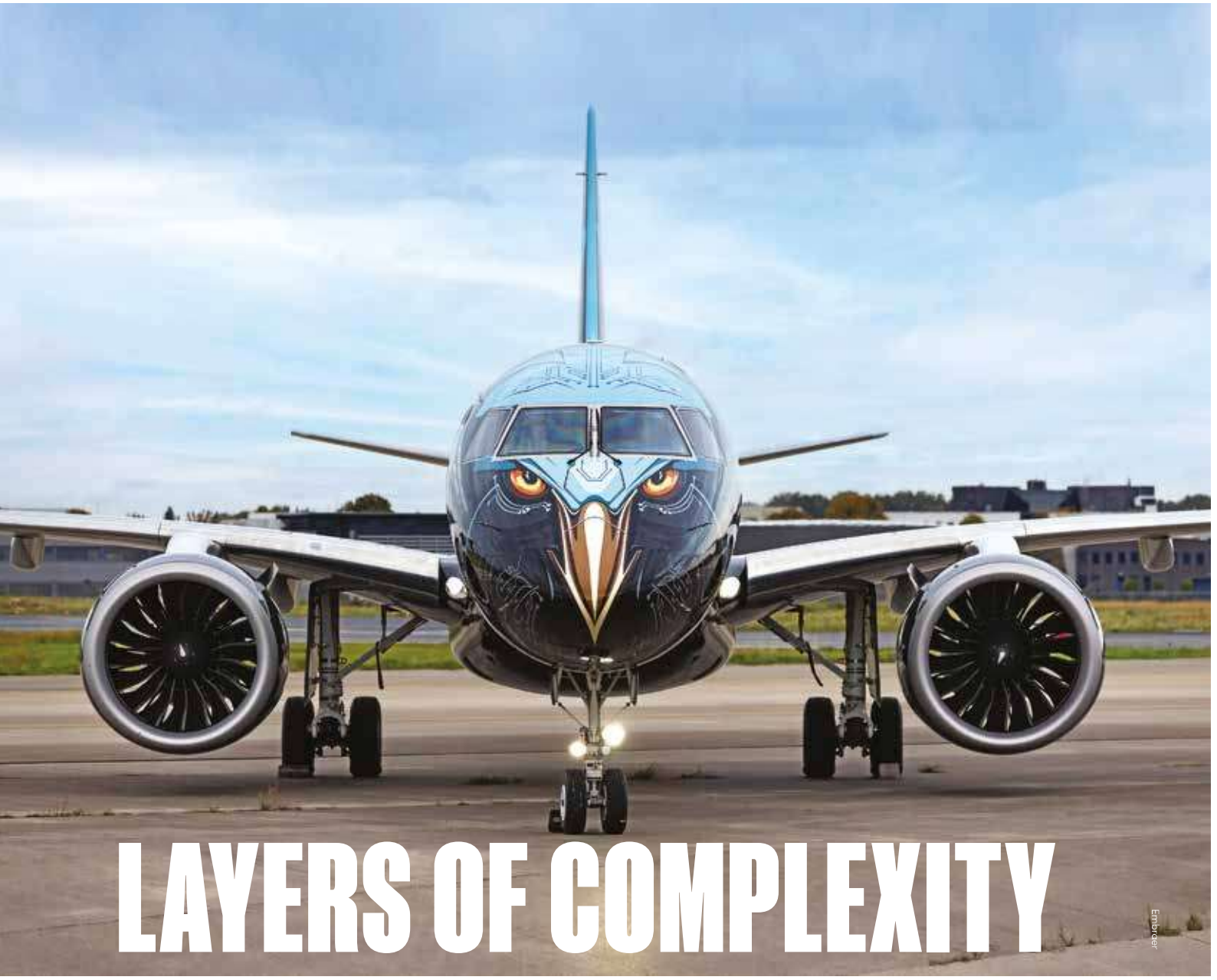


LAYERS OF COMPLEXITY

Embraer

Mario Pierobon explores how the industry is responding to the complexity of aircraft paint jobs, and the impact these have on workforce capability, production planning and aircraft performance

The evolution of aircraft liveries, from simple, uniform colour schemes to intricate, multilayered artworks has upgraded the role of aircraft paint shops across the MRO sector.

Airlines are using special-edition designs and brand partnerships to differentiate themselves, enhance passenger engagement and reinforce their identities.

Behind every livery lies a technical and operational evolution. From specialised skill sets and advanced training programmes to modern materials engineered for lighter weight and precise film thickness control, the industry is being pushed to innovate at multiple levels.

Complex liveries

As liveries become more elaborate, the technical requirements placed on applicators increase significantly, according to Ed Hilborne, global product management and commercial marketing manager at AkzoNobel Aerospace Coatings. "Standard fleet schemes require solid basic skills in surface preparation, masking and spray technique," he explains.

"Complex liveries require these skills, along with advanced capabilities in layout symmetry, precise multi-stage masking, colour matching, film thickness control on overlapping layers, and time-sensitive defect correction. A prime example is the 'Tech

Eagle' livery for Embraer's E195-E2. Painted by MAAS Aviation using over 14 colours from our Aerodur 3001 basecoat/clearcoat system, the project required a team of 38 highly skilled painters who worked in continuous shifts for 15 days to meet the submission deadline."

Hilbourne adds: "Projects of this nature demonstrate how craftsmanship, coordination and process control remain critical when designs become highly detailed."

Another example is Brussels Airlines' 'Gravity' livery, which brings Tintin's lunar adventures back to the skies. Mankiewicz provided the paint needed for this livery, consisting of 28 different colours.

René Lang, executive managing director aviation, says, "For highly multicoloured schemes like this in particular, the coating system must support a fast, reliable paint process so the complexity does not translate into extended downtime, while remaining flexible enough to accommodate intricate designs.

"An advantage of our Alexit basecoat/clearcoat system is its compatibility with the so-called wild spraying technique, which inverts the traditional paint process sequence. The principle is simple: rather than starting with the dominant colour, the least-used colour is applied first. In a conventional workflow, the most prevalent colour, typically white, is sprayed first, followed by the secondary colours in descending order of coverage area.

"Between each application, extensive masking is required, driving both labour input and material consumption. Thanks to the hiding power of Alexit basecoat/clearcoat, this sequence can be reversed, delivering substantial savings in time and masking materials."

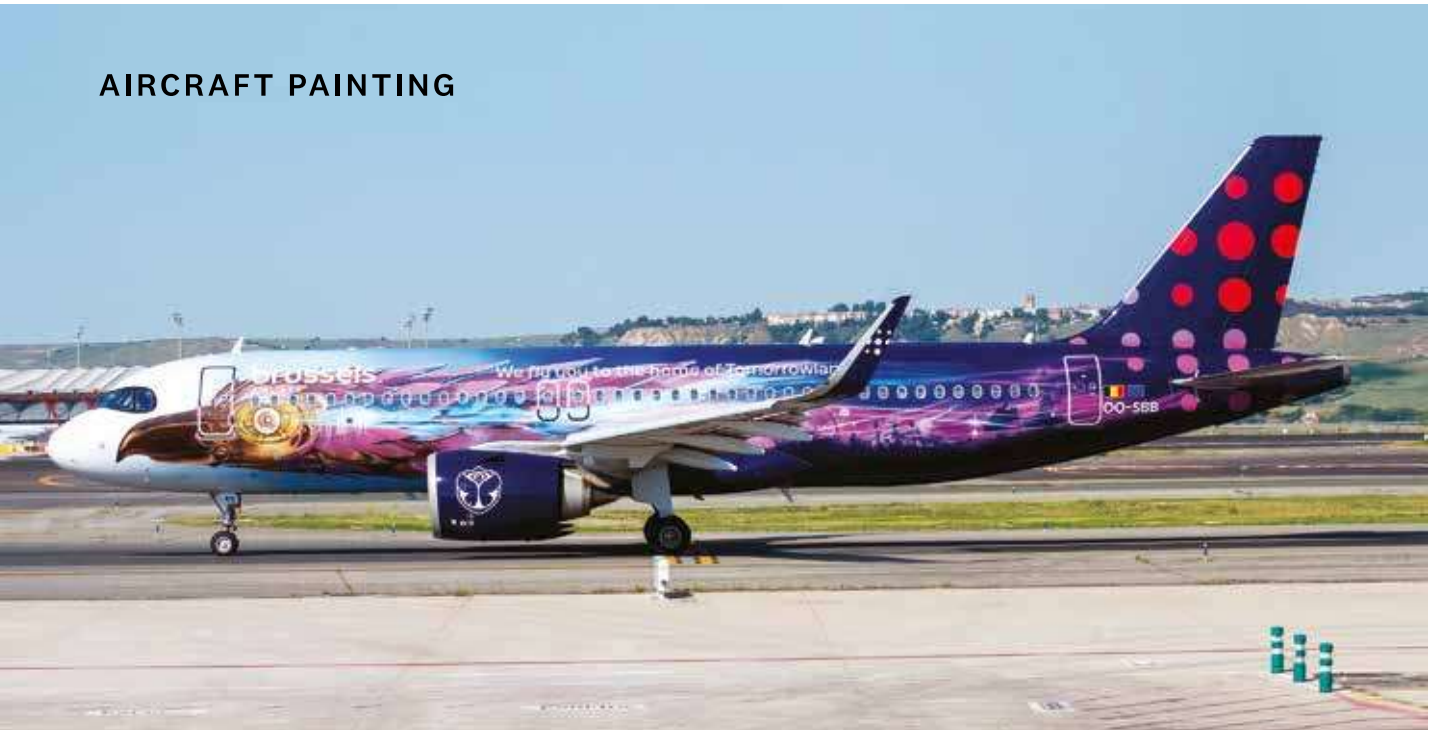
Lang adds: "Wild spraying can also enable concurrent application of two colours, provided sufficient separation is maintained to prevent overspray interaction. Particularly for special liveries, this is very helpful."

At Brussels Airlines, once the design of a Belgian icon is finalised, the airline works with partner Airbourne Colours to begin planning the paint job, according to the Brussels Airlines team. "Sometimes they can do it themselves; at other

"AS AIRLINES CONTINUE TO EMBRACE EVER MORE ELABORATE LIVERIES, THE DEMANDS PLACED ON PAINT SHOPS, APPLICATORS AND MATERIAL SUPPLIERS WILL ONLY INCREASE"

▲ René Lang, executive managing director aviation, Mankiewicz

◀ The Embraer E195-E2 'Tech Eagle' project required a team of 38 highly skilled painters



alfonsosm/Adobe Stock

“THE SHIFT TOWARD HIGHLY DETAILED, MULTICOLOUR DESIGNS REQUIRES NOT ONLY ADVANCED TECHNICAL CAPABILITIES BUT ALSO A DEEPER EMPHASIS ON TRAINING, CERTIFICATION AND COORDINATED WORKFLOWS”

▲ Brussels Airlines’ Tomorrowland design by Airbourne Colours

times, additional expertise is needed,” the team explain. “For our Amare aircraft, for example, we worked with an artist who was called in to the paint shop, as many details of the plane needed to be hand-painted. We evaluate in advance how long it will take to apply the design and which materials to use. We have not encountered any weight distribution issues and, naturally, we only use approved and certified materials.”

Simon Cracknell, sales and marketing director of Airbourne Colours, affirms that for extremely complex liveries, such as those applied to the ‘Tomorrowland’ or ‘Atomium’ aircraft that Airbourne Colours painted for Brussels Airlines, they typically rely on specialised external personnel.

“As with most aircraft we paint, the weight does not increase significantly, as some paint is always removed first,” explains Cracknell. “In fact, sometimes the aircraft returns to service with a lower weight, due to the volume of existing paint layers removed.

“All aircraft will also be weighed, both physically or calculated, after painting to determine the actual/estimated weight of the aircraft after painting and whether this changes the centre of gravity.”

Personnel qualification

Ambitious liveries increase the risk of inconsistencies in gloss levels or colour transitions, and this requires professional skills, which poses a broader challenge for the industry, according to Hilborne.

“The available pool of applicators trained to consistently high standards is struggling to meet demand,” he says. “To address this gap, AkzoNobel Aerospace Coatings has launched an AS7489-certified training programme, aligned with the globally recognised SAE International framework for aerospace organic coatings applicators. Our programme is structured into five progressive levels, from theoretical fundamentals to advanced practical assessment and specialised skills.”

Complex livery projects require a higher level of technical expertise and experience than simpler ones, affirms Richard Marston, chief commercial officer at MAAS Aviation. “We offer a structured training programme that takes painters from Level 0 to Master Painter Level 5,” he says. “The expertise of our senior team has been honed over the years and is constantly shared among employees through a collaborative team approach. While all painters contribute to the process, the more complex livery elements are typically performed by our most experienced staff.”

Mankiewicz’s Lang points out that as the number of paint layers increases, preparation and work sequencing must be more carefully planned and coordinated to optimise work times.

He says: “More complex liveries therefore require longer painting runs and tighter production control. Each additional paint layer adds weight. Aircraft carrying multi-coloured schemes typically accumulate a greater total mass of paint on the aircraft’s exterior surface.”