



AIRCRAFT PAINTING PART 1 – LIVERY COMPLEXITY AND TURNAROUND TIMES

BY MARIO PIEROBON

AN AIRCRAFT'S LIVERY IS NO LONGER JUST A COAT OF PAINT. AS AIRLINES INCREASINGLY TREAT THEIR FLEETS AS MOVING BILLBOARDS, COMMISSIONING ANNIVERSARY SCHEMES, PARTNERSHIP DESIGNS, AND ELABORATE STORYTELLING LIVERIES, THE VISUAL AMBITION ON DISPLAY AT ANY MAJOR AIRPORT HAS GROWN REMARKABLY. YET BEHIND EVERY EYE-CATCHING DESIGN LIES A PRACTICAL CHALLENGE: KEEPING COMPLEX PAINTWORK FROM EATING INTO FLEET AVAILABILITY AND DRIVING UP MAINTENANCE COSTS. WITH DOZENS OF COLORS AND INTRICATE GRAPHIC LAYERING NOW MORE COMMON, THE NEED OF AIRLINES AND MROS ALIKE IS FOR PAINT TECHNOLOGY TO KEEP PACE WITH THE CREATIVITY OF THE DESIGNERS.

LIVERY COMPLEXITY

Over the past decade, aircraft paintwork has evolved under two parallel pressures, more ambitious livery designs and the need to protect fleet availability and operating margins shares Ed Hilborne, global product management and commercial marketing manager at AkzoNobel Aerospace Coatings. "Looking back to around 2015, many major airlines' liveries focused primarily on brand identity, with designs that emphasised bold color blocks and clean typography. While distinctive, these liveries were more restrained in terms of color count and graphic layering," he says. "For MROs, this meant predictable sequences and repeated application processes across

fleets. Today, aircraft exteriors are much more storytelling-focused, with airlines commissioning anniversary liveries, partnership liveries, and highly expressive designs to generate global visibility and capture attention. Aircraft have become strategic brand assets, and from the perspective of maintenance professionals, this shift has practical consequences."

René Lang, executive managing director for aviation at Mankiewicz, observes that there is a trend shift in livery complexity. "A distinctive, brand-defining scheme does not necessarily require a multi-colored design or extensive use of mica-effect finishes. Prestige and efficiency can coexist seamlessly, as demonstrated by Lufthansa's 100th anniversary special

livery. Condor also opted for a bold visual signature with its striped look, achieving global recognition with just two colors," he says. "At the same time, each year brings exceptional concepts in the special livery segment, where designers leverage multiple colors and striking, large-scale patterns. A recent example is Brussels Airlines' 'Gravity' livery, which brings Tintin's lunar adventures to the skies. For highly multi-coloured schemes like this one, the paint system must support a fast and reliable painting process. All these liveries, from the Lufthansa anniversary scheme and Condor's striped look to Brussels Airlines' 'Gravity', were realized using our ALEXIT basecoat/clearcoat system."

The standard livery design has not become more complex, affirms Brussels Airlines. “We launched a new brand identity in 2021, and this new livery is easier to apply than the previous one. Our world-famous ‘Belgian Icons’ are obviously more complex, but this has no impact on durability. We have several in-house experts who can make small adjustments to the livery if necessary,” the airline says.

Where a traditional scheme might once have required a limited number of colors, contemporary projects can involve dozens, affirms Hilborne. “China Southern Airlines’ ‘Beautiful Greater Bay Area’ aircraft, for example, required 44 colors within the Aerodur 3001 basecoat/clearcoat (BCCC) system to achieve the desired finish. Each additional color increases the complexity of masking. Special effect finishes add further technical challenges,” he says. “The Cessna Grand Caravan ‘Blue Chameleon’ freighter features a tail that shifts between cyan and purple depending on the angle and lighting conditions. Achieving this effect required a carefully engineered BCCC system with a custom tint, as well as rigorous control of film build and curing. Such visually appealing finishes leave little room for variation in application.”

TURNAROUND TIMES

With our ALEXIT basecoat/clearcoat system and the Wild Spraying technique, complex liveries can be completed efficiently, helping to keep turnaround times under control while providing the flexibility needed for sophisticated designs, affirms Lang. “Durability and maintenance frequency are equally important for both simple and complex colour schemes. Airlines generally want their aircraft to maintain a sleek, fresh

appearance for as long as possible,” he says. “Therefore, for commercial airline liveries, the industry standard is a BCCC system. The basecoat defines the aircraft’s color, while the clearcoat provides protection against external factors such as ultraviolet (UV) exposure and imparts a long-lasting shine.”

Average aircraft turnaround times have accelerated thanks to the advent of BCCC technology, which allows for color reversal after two hours, according to Simon Cracknell, sales & marketing director at Airbourne Colours. “Conventional paints can take up to eight hours before any new masking can begin. Special and complex liveries do not impact durability or maintenance frequency, as they are typically finished with a clearcoat as the final step, which protects all colours. The same painting system is also used for complex and basic liveries,” he says.

Richard Marston, chief commercial officer at MAAS Aviation, points out that, over the past decade, average aircraft painting turnaround times (TAT) have improved significantly. “This progress has been driven primarily by advances in paint technology and process optimization. The introduction of chromium-free pretreatments, improved primer systems, and BCCC systems has simplified the entire application process,” he says. “Historically, high-solids topcoat systems required drying intervals of approximately eight-to-12 hours between each colour application. In contrast, modern basecoat systems achieve a dry-to-tape time of approximately two-to-three hours. This advancement allows for more efficient application of complex, multi-coloured liveries, with only the final clear coat requiring a longer drying period of eight-to-12 hours.”

Regarding durability and maintenance, increased livery complexity does not typically result in higher maintenance frequency when high-performance paint systems are used. However, graphic wraps used for intricate designs generally have a shorter lifespan compared to fully painted systems, according to Marston. “BCCC systems offer superior UV stability and long-term performance, allowing airlines to align repainting requirements more closely with heavy maintenance schedules rather than interim inputs,” he says.

SUMMING UP

BCCC system technology and process optimization have compressed turnaround times and extended the life of even the most intricate schemes, decoupling visual ambition from operational penalty. For airlines, this means the sky is the limit when it comes to brand expression. For MROs and paint specialists, it represents the culmination of a decade of quiet but transformative progress. As livery designs continue to push boundaries, the industry’s ability to execute them efficiently and durably looks set to keep up. ■



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