The influence of business models and carrier nationality on global airline liveries: an empirical analysis of 637 airlines.

Lucy C S Budd
Transport Studies Group
School of Civil and Building Engineering
Loughborough University
Leicestershire
LE11 3TU

Email: L.C.S.Budd@lboro.ac.uk
Telephone: 01509 223409

Abstract
The colours and design motifs that are applied to the world's commercial aircraft fleet are one of the most visible and familiar expressions of an airline's brand and corporate identity. Some logos, including Lufthansa's flying crane and American Airlines' Eagle, have existed in various forms for over 80 years and have become iconic symbols of commercial flight whereas others have come and gone very quickly as new airlines have entered and left the marketplace. All airlines strive to develop corporate identities which not only convey the core essence of their brands in memorable, instantly recognisable, and culturally appropriate ways, but which also differentiate them from their competitors. One of the most visible and integral components of an airline's corporate identity is the livery that is applied to its aircraft. However, despite the diversity and commercial importance of airline liveries, academic considerations of their form and content are rare. This paper reports on the findings of an in-depth visual content analysis of 637 global airline liveries. It identifies the most common design features and discovers that the use of particular colours, colour combinations, visual motifs, typefaces, and design characteristics vary both by the nature of an airline's operation (whether full-service, low-cost, regional, charter, or cargo) and its geographic origin. The significance of the findings for current and future practices of airline marketing and corporate identity management is discussed.

Keywords: commercial airlines, airline liveries, corporate identity.

1. Introduction

The colourful and sometimes controversial liveries that are applied to the world's commercial aircraft fleet are one of the most visible and instantly recognisable expressions of an individual airline's brand. Air Canada is synonymous with its Maple Leaf, Lufthansa with its blue and gold flying crane, easyJet by its bright orange wordmark, and American Airlines by its patriotic red, white and blue full-length triple cheatline superimposed over a highly polished metal fuselage. At their most basic level, airline liveries seek to

1

'catch the public eye' and, ideally, 'persuade people to fly' with a particular airline (Christy, 1992 p8) yet the ways in which they do this are both subtle and complex. Through the judicious use of colour, colour combinations, design characteristics, visual motifs and typefaces, airline liveries not only visually differentiate one airline's aircraft from those of another but they also seek to influence consumer perceptions of the airline by promoting the notion that a particular carrier is safe, reliable, sophisticated, innovative, or fun. Yet despite the ready-availability of numerous full-colour airline livery identification guides for aviation enthusiasts (see Chant, 1997, 2002; Flack, 2003; Taylor, 1997) and the demonstrable relationship between airline livery recall and commercial success (Henderson, 1997), academic analyses of the visual content and design characteristics of global airline liveries are very rare. On the rare occasions where they have occurred, the studies have focused on either the historical evolution of one particular airline's livery or on the visual motifs that are applied to a selected part of the airframe.

Building on Thurlow and Aiello's (2007) semiotic analysis of the design motifs that were applied to 561 airline tailfins, this paper examines the visual content and design characteristics of 637 global airline liveries as they are applied to the whole aircraft (including the fuselage, engines, and tail). It identifies the most common design features and dominant visual motifs that are employed and, crucially, discovers that an airline's business model and geographic origin affect the content and visual presentation of airline liveries in ways that have hitherto been undocumented and unappreciated. The paper begins with a short discussion of the strategic importance of airline corporate and visual identities and the historical evolution of airline liveries, before the data collection method is described, the findings presented, and their implications for practices of airline management and air transport research discussed.

2. Airline liveries and visual identities

Much of the existing literature on airline marketing and brand management emphasises the importance of airlines developing strong brands and associated visual identities that are not only consistent, instantly recognisable, visually distinctive, and culturally acceptable, but which also convey the core attributes and brand values of the carrier concerned (Shaw, 2004). For Driver (1999, p141), it is imperative that an airline's brand reflects 'a distinctive competence in comparison with alternative brands' so as 'to allow the brand name, symbol, or identity to mean something distinctive and [carry] a corresponding appeal'. The choice and visual presentation of different colours, colour combinations, typefaces, visual motifs, and other design characteristics collectively shape how an individual airline is perceived by investors, its employees, its passengers, its competitors, and the general public.

While the majority of the world's airlines conventionally adopt a single visual identity for reasons of utility and brand standardisation, some carriers paint individual aircraft in distinct (although still recognisable) colour schemes. The tails of New York-based JetBlue's aircraft, for example, are adorned with

different blue-themed geometric designs while those of US carrier Frontier carry unique photographic images of different species of native North American wildlife. Other airlines have sought to differentiate their brands by adopting unconventional combinations of colours and design features or by commissioning special 'one-off' commemorative liveries that are applied to one or two aircraft for a limited period of time to celebrate an anniversary, mark a major sporting or cultural event, or publicise a sponsorship deal. Yet irrespective of the type of visual identity that is adopted, all of the individual components of an airline's livery, from the size, font, size, style, and location of typefaces, to the combination of colours and visual motifs, are carefully selected to convey particular brand attributes. The dark blue, grey, and white hues employed by the forerunner of the present-day British Airways, British Overseas Airways Corporation (1940-1974), were deliberately selected to convey notions of safety, reliability and professionalism as well as 'a comfortable warm feeling in wintry conditions' and 'a sensation of refreshing coolness in the tropics' (Holmes, 1947, cited in Eisenbrand, 2003 p150) while others convey notions of national identity by utilising the colours of their nation's flag or seek to visually differentiate their operation by adopting visually arresting and unconventional colour schemes.

Crucially, the ways in which particular colours, combinations of colours, typefaces, and motifs are interpreted and imbued with culturally (and often regionally) specific religious and/or cultural meanings varies not only by cultural context but also by time. It has long been appreciated that certain colours and colour combinations, which have particular associations in one culture, may hold very different or even offensive ones in another (Adams and Osgood, 1973; Aslam, 2008). It is thus crucial that airlines, which often serve multiple markets in different world regions, develop culturally appropriate and globally meaningful visual identities that convey enduring notions of safety, reliability, and customer service. In an era of heightened competition and diminished margins, establishing and retaining a strong visual identity and associated customer loyalty is vital to commercial success and mistakes can be costly.

In 2001, four years after their launch, British Airways was forced to abandon its £60m brightly-coloured 'world images' livery and restore a single, and more recognisably 'British', identity to its aircraft (Yarwood 2000). In 2007, Belgium's SN Brussels Airlines was forced to modify its new corporate identity when a superstitious member of the public noticed that the letter 'b', which adorned the tail of the aircraft and was composed of individual red dots designed to resemble runway lights, only contained 13 dots (a number believed to be unlucky in many countries) a 14th was hastily added. Moreover, as the recent merger of US-based United and Continental Airlines has shown, passengers hold real affection for certain logos and there was consternation in some quarters when it was revealed that United Airlines' signature 'tulip' logo would be replaced by Continental's abstract globe motif following the merger (Clark, 2010). As these, and other examples demonstrate, liveries matter to airlines because they affect how investors, competitors, consumers, and (perhaps most importantly) potential customers perceive the brand.

2.1 Historical evolution of airline liveries

In the early days of commercial flight at the beginning of the twentieth century, there were few airlines, little competition, and no real imperative to visually differentiate one airline's aircraft from another. The very earliest 'liveries' therefore often featured little more than the airline's name and the aircraft's registration markings painted in large letters on the wings and the side of the fuselage (Lovegrove, 2000). The convention of applying standardised corporate logos to aircraft began in 1919 when the forerunners of many of today's national flag carriers began flying regular commercial services. Deutsche Luft Reederei, a forerunner of the present-day Lufthansa, began routinely applying the company's newly-designed symbol of a soaring crane to all of its aircraft from 1919 while the Netherlands' new national carrier, Koninklijke Luchvaart Maatschappij, unveiled a new (and enduring) visual identity based on its acronym, KLM, and a crown which symbolised the nation's Monarchy (ibid, 2000). In France, aircraft belonging to Air Union were adorned with a winged seahorse logo that alluded to the carrier's flying boat operation while Imperial Airways of the United Kingdom adopted what was to become its iconic 'speedbird' logo in 1924 (ibid, 2000). Significantly, all four of these logos have survived (albeit in revised forms) subsequent takeovers and corporate re-branding exercises and continue to adorn the aircraft of today's Lufthansa, KLM, Air France, and British Airways respectively.

After the Second World War, proponents of a new discipline of graphic design quickly turned their attention towards airlines. The start of the jet age in the late 1950s and early 1960s, in particular, stimulated major innovations in airline livery design and visual identity. Jet aircraft, such as de Havilland's Comet, Boeing's 707, and McDonnell Douglas' DC-8, were considered to epitomise all that was new, exciting, and progressive about modernity and airlines sought to develop new typefaces and visual logos that would speak to the developing worldview of a new generation of 'jet set' travellers. However, in addition to providing an opportunity to transform the form and function of airline liveries, the introduction of these new aircraft created a number of significant visual design challenges, not least how to disguise the long and thin 'tube like' look of the fuselage (which was believed to unnerve some passengers) and make the large airframes more visually attractive (Middleton, 1986).

The new jet aircraft were typically much larger than the piston and propeller-engined aircraft they replaced and their pressurised metal fuselages were vulnerable to corrosion, dirt, and the effects of high-altitude flight. In order to protect the airframe from corrosion, the fuselage had to be covered in layers of protective acrylic urethane or polyester urethane paint (Lufthansa Technik, 2011). However, the colours and the visual complexity of early airline liveries were restricted both by the paints and the painting techniques that were available at the time but also by operational factors. At a cruising altitude of 30,000ft or more, aircraft were exposed to high levels of solar radiation. Out of necessity, therefore, the upper portions of the fuselage had to be painted in light colours that would minimise heat generation in the cruise by reflecting sunlight back into space. As a consequence, light colours (usually shades of

white or cream) were often used. However, in addition to fulfilling a practical purpose in flight, there was also a commercial imperative to keep aircraft looking clean and presentable when on the ground. In order to disguise dirt that was thrown up from wet runways and taxiways and mask any hydraulic leaks, fuel spills, and soot from the engines, many airlines considered it prudent to paint the undersides of their aircraft and the lower third of the fuselage in darker colours, often shades of grey or dark blue. The horizontal interface between these two colour zones was often demarcated by a 'cheatline', a stylistic or decorative single or multiple horizontal band of colour that was applied to both sides of the fuselage and ran along its entire length.

With the base colour(s) chosen, airlines were then free to develop and apply distinctive typefaces, iconographic symbols, and design features to the otherwise unadorned fuselage. Most airlines chose to paint their full name or an abbreviation of their name somewhere on the fuselage and devised a series of word and/or design marks that would not only instantly identify their aircraft at crowded airports around the world but also convey their core brand values. In 1957, in anticipation of the inauguration of their new Boeing 707s into commercial service, US airline Pan American unveiled their new corporate identity. Designed by Edward Larrabee Barnes and Charles Forberg, it featured a sky blue circle inscribed by abstract lines of latitude and it quickly became an icon of a new age of global aeromobility. The new logo was intended to be a graphic ambassador for a new era of international air travel in which distance, that great obstacle to mobility, had been apparently overcome (Zukowsky, 1996). The motif invoked notions of connectivity, speed, and global domination (at least in commercial aviation terms), and was intended to convey the idea that Pan Am's passenger and cargo services encircled the earth (Leslie, 2005). The Pan Am brand quickly permeated international public consciousness and, as one of the premier travel brands of the 1960s, the logo was purportedly second only to Coca Cola in terms of international consumer recognition and remains an enduring symbol of commercial flight (ibid, 2005).

2.2 Contemporary airline liveries

A visit to any commercial airport will reveal the diversity of the liveries and the visual identities that airlines employ. In order to visually differentiate their aircraft from those of their competitors, airlines will usually apply a single standardised livery to their entire fleet. As Thurlow and Aiello (2007) have shown, airlines utilise a relatively small number of basic visual motifs. All tailfin designs, they suggest, can be classified into one of seven categories according to whether they feature an icon of flight, such as a bird, a wing, or an aircraft; an icon of space or of distance (e.g. Atlas Air's globe or Air Transat's star); an icon of direction, or speed, or motion (including arrows, stripes, and ripples); or an icon of nationhood such as a stylised representation of a national flag (e.g. Alitalia and British Airways) or depictions of native flora and fauna (such as Aer Lingus' shamrock and Qantas' kangaroo respectively).

All of these motifs seek, in various ways and through different design techniques (such as darting and tapering) to engender notions of flight, speed, efficiency, and movement through the air. In every case, strategically significant combinations of colours, typefaces, designs, and visual motifs are employed to invoke particular cultural meanings and associations. Many motifs are intentionally polysemous (i.e. possess multiple meanings) with Austrian Airlines' 'dart' motif, for example, variously representing an arrow, a bird, a dart, and/or a stylised aircraft.

Many of the logos Thurlow and Aiello examined also exhibited different degrees of abstraction and stylization with images of birds, for example, variously being depicted in the form of photographs (Frontier Airlines), anatomically detailed outlines (Khalifa Airways), or, more commonly, as abstract representations or artistic stylisations (Singapore Airlines, Sri Lankan, and Garuda, amongst many others). Eisenbrand (2004) explains that this preference for abstract or highly stylised logos is a function of the fact that simpler images make for more recognisable and memorable design marks as they can more easily be identified at a distance, at an angle, at speed, or in poor light. However, the tailfin motif is only one element of the overall livery and, in order to document the complexity and diversity of the entire livery, this paper will analyse the design features that are applied to the whole airframe.

2.3 Unconventional and one-off designs

Despite the widespread adoption of standardised fleet-wide liveries there have been, and continue to be, some notable exceptions to this rule. Braniff of the United States, for example, declared an end to 'the plain plane' in the 1960s and painted the entire fuselage of individual aircraft in different bright colours including orange, sky blue, and lime green. This multicoloured approach was subsequently adopted by the UK-based charter operator, Court Line, who painted their Tristars and BAC1-11s shades of pink, pale yellow, and tangerine. When British Airways low cost subsidiary, Go, was launched in 1998, the lower third of the fuselage of each of their B737-300 aircraft was painted in a different colour, including purple, yellow, pink, and green, and individual phrases incorporating the airline's name (including 'away we go', 'off we go' and 'go today') were painted below and aft of the forward passenger doors.

Innovations in aircraft paints and painting techniques during the latter decades of the twentieth century, which included the development of air brushing, foils, and decals, meant that aircraft no longer had to be painted in solid blocks of primary colour. In addition, the ability to apply subtle gradations, highlights, taperings, and other visual design techniques rendered the reproduction of photographs and complex visual images possible for the first time. In the mid 1990s, Colorado-based low fare operator Western Pacific Airlines pushed the boundaries of what was technically possible and transformed the painting of their aircraft from a cost item into a revenue stream by selling the space on the side of their aircraft and converting them into flying billboards. One of Western Pacific's 'logo jets' carried a photograph of a Las Vegas showgirl

while another depicted characters from 'The Simpsons' cartoon series. The trend for paining aircraft in special one-off schemes was also pursued by Southwest Airlines who painted three B737s in 'Shamu The Killer Whale' livery to promote Sea World parks in California, Florida, and Texas. A number of other low cost airlines, including the Irish operator Ryanair, have also operated logo jets for a limited period of time and even some full-service carriers have applied special one-off paint schemes to a small number of aircraft to celebrate sponsorship deals or to publicise major sporting or cultural events.

Ethiad of the UAE, for example, painted an aircraft in the colours of the UK football club Manchester City, while aircraft operated by Turkish Airlines have appeared in the colours of rivals Manchester United. Air New Zealand, meanwhile, have flown aircraft with decals depicting scenes from The Lord of the Rings movie trilogy which was filmed in the country as well as in the colours of the national rugby team, the All Blacks. In addition to these unique time-limited colour schemes, many full-service airlines have marked significant anniversaries of their foundation by painting current aircraft in the liveries worn by their aircraft during the 1950s, 1960s, or 1970s. These so-called 'retro-jets' allude to the carrier's long corporate history and offer a nostalgic link to a past era of flight. In so doing, they undoubtedly seek to emphasise the airline's long commercial pedigree and thus its dependability, credibility, and reliability.

3. Method

In order to document the design features of the liveries used by the world's global airlines a single comprehensive source, which depicted the liveries of hundreds of different airlines from around the world in a consistent format, was selected. The data on which this research is based was derived from the full-colour graphic depictions of airline liveries published in Gunter Endres and Graham Edwards' *Airline Recognition Guide* (2006, Jane's). Although designed primarily as an enthusiasts' title, the publication represents a valuable academic source as it features full colour illustrations and short textual descriptions of the content of over 700 airline liveries. As importantly, (and unlike many other titles that merely detail the airline liveries that are most likely to be seen at airports in the UK or Europe), the book was global in scope.

With the source identified, every airline livery depicted within it was manually coded by the author using a coding frame that documented 25 separate pieces of information about the visual content and design of each livery. Basic details, including the airline's registered name, country of origin, and the primary nature of its operation (whether full service, low cost, cargo, charter, or regional), were identified and recorded. Next, the number and type of colours that were used were counted. Owing to the diversity of hues and shades that were used, all the colours were classified into one of 20 categories - red, maroon, brown, purple, pink, yellow, gold, orange, white, green (light, mid, and dark), blue (light/turquoise, mid, and dark), grey (light,

mid, and dark), silver, and black. If a livery featured a solid white fuselage with a single red cheatline, it was recorded as having two colours – white (base colour) and red (secondary colour). The presence or absence of a cheatline was recorded as was its length (i.e. whether they ran along the entire length of the fuselage or only for a portion of it), the number and type of colour(s) used in it, and its position (above, below, or along the line of the main deck passenger windows).

A record was also made of whether the airline's full name appeared on the fuselage and, if so, where and the sort of typeface that was used. To classify its position, the fuselage was spilt into 10 sections. 'Front' sections referred to all areas of the fuselage that were forward of the leading edge of the wing root, 'middle' positions described the area between the front and rear of the wing root, and 'rear' referred to all locations aft of the trailing edge of the wing root. Each of these three sections was further subdivided horizontally into three categories – lower, middle, and upper - according to whether the name appeared below, along, or above the main deck passenger windows. This resulted in nine locations with the 10th being the tail or vertical stabiliser. The typeface used for the airline's name was also classified according to whether it appeared in uppercase, sentence case (i.e. upper and lower case), or lower case letters only and also whether the typeface used was standard (i.e. non-italicised), italicised, or akin to a handwritten script.

The motif on the tailfin was then coded as one of 17 categories according to its primary content. The 17 categories were: aircraft, animal, arrow, bird, botanical symbol (tree, leaf, flower, or petal), celestial objects, compass, crown, flag, local meaning/cultural emblem (e.g. a tribal mask or totem), icon of motion, mythical creature, company name, no motif, people, topographic symbol (mountains), and 'other'. Polysemous motifs were coded according to the primary motif as identified by the author. Details relating to the colour(s) the engines were painted and whether or not they featured any text or motifs was also recorded. Finally, data on whether the carrier's webpage appeared on the fuselage and, if so, where (using the same 10 point classification system devised for recording the location of airline names), was captured as was whether the livery featured the logo of an airline alliance, depicted the national flag of the country of origin and, in the case of European operators, featured the EU flag.

Regional carriers and subsidiary airlines which carried the same basic livery as their parent companies (e.g. Delta Connection and US Airways Express) were excluded from the analysis. This resulted in a 21,600-cell dataset that contained quantitative information about the liveries of 637 global airlines. The entire dataset was initially analysed to identify the common design characteristics of all airline liveries and then disaggregated according to airline type and geographical origin.

4. Principal findings

Of the 637 airlines examined, 39% were registered in Europe, 16% in Asia, 15% in North America, 10% in Africa, 9% in South America and the Caribbean, 6% in Australasia, and 5% in the Middle East. Over one third (34%) were regional carriers (i.e. they did not fly outside the world region in which they were based), 31% were global full service carriers (FSCs), 15% were charter operators, 11% were low cost airlines (LCAs), and 9% were cargo operators.

4.1 Colour

Colour is an integral part of all airline liveries and different colours and colour combinations are used to variously convey particular brand attributes of the airline concerned including professionalism, warmth, fun, reliability, and innovation. Collectively, white was by far the most common basic fuselage colour and was used by 90% of all the airlines surveyed. However, a small number of carriers used blue (22 airlines), silver (10 airlines), and red (9 carriers) fuselages. Bright yellow base fuselages were used by six airlines, including cargo operator DHL and Welcome Air of Austria. 53% of all the liveries surveyed employed three colours (the base fuselage colour plus two others), 27% used four, and 13% only used two. The highest number of colours recorded on a single livery was eight. This suggests that there is an optimum number of colours that should be used. Apart from white, the most frequently occurring colours were blue (which was used on 352 of the 637 liveries examined) and red (248/637). Yellow was used by 114, green by 81, black by 61, and orange by 53. Pink and purple were only used in 15 and 12 liveries respectively. The most popular two-colour combination was a white fuselage and blue paint, the most common three-colour combination, perhaps reflecting the large number of national flags that feature these colours, was a white fuselage with blue and red details (60 airlines).

As with the fuselage, white was the most popular choice of engine colour (accounting for 56% of the liveries surveyed) followed by shades of blue (7%) and grey (6%). 77% of the engines (488 liveries) were painted in a single colour and did not feature any motifs or other information. 92 featured a smaller version of the motif that appeared on the tailfin, 29 featured the airline's name (or an abbreviation of it), 27 detailed the airline's web address and one displayed the airline's telephone reservations number.

4.2 Cheatlines

219 liveries featured a cheatline. The majority of these, 116, featured blue paint, with red and green shades employed in 78 and 24 respectively. In terms of physical location, the majority (90) were positioned immediately under the main deck passenger windows to separate blocks of solid colour on the upper and lower fuselage, while smaller numbers appeared along the bottom third of the fuselage and along the main deck window line. 208 of the

219 cheatlines ran for the full length of the fuselage with the remainder only appearing on part of it.

4.3 Name

Having the name of the airline clearly displayed on the fuselage was evidently considered an important element of their visual identity. 61% of the all the liveries surveyed featured the full name of the carrier somewhere on the fuselage. The majority of these names (79%) were located on the front portion of the fuselage forward of the leading edge wing root. The most popular position was at the front of the fuselage above the main deck passenger windows (45% of airlines chose this location) while the least popular was the lower portion of the rear fuselage (only five airlines placed their name here). The choice of location is clearly significant and the demonstrable preference for locations at the front of the aircraft may be because the human eye is naturally drawn towards the front of the aircraft and so positioning the name here ensures maximum visibility and impact.

4.4 Typeface

As Henderson *et al* (2004) have shown, typeface design communicates strategic corporate objectives. Indeed, consumer perceptions of brands are known to be influenced by typeface, with different fonts communicating semantic messages that are often distinct from the content of the written words they convey (ibid, 2004). The content analysis undertaken as part of this research revealed that the visual properties of the typefaces used by the world's airlines varied considerably. 51% used capital letters only to detail their name, 34% employed sentence case, and 15% employed lower case letters only. 56% were standard typefaces (i.e. not italicised), 36% were italicised (possibly in an attempt to make them appear more dynamic and imply movement through the air), while the remaining 8% appeared in typefaces that were akin to handwritten script.

4.5 Tailfin motifs

Of the 17 categories of design motif on the tailfin, airline names, birds and celestial icons were the most common (Figure 1). Only 10 of the 637 analysed liveries did not feature any form of motif on the tail.

Figure 1: Airline tailfin motifs by category
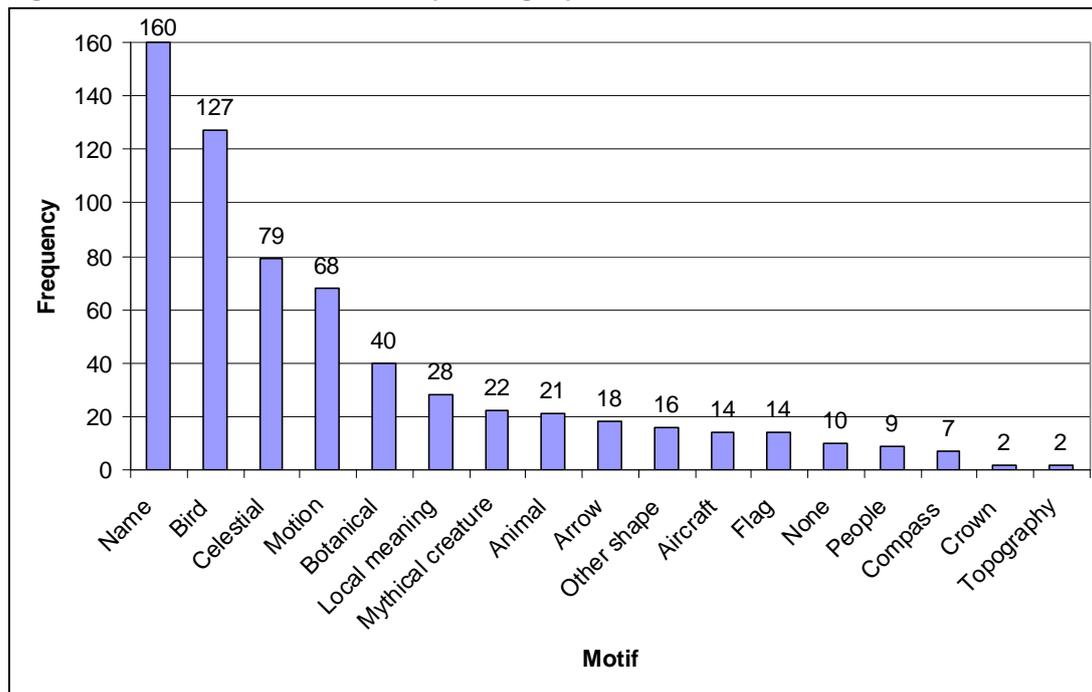
4.5 Other design features

Fewer than one fifth (19%) of the liveries examined featured an airline's web address. Where a web address did appear, the most popular location was at the rear of the aircraft above the main deck passenger windows (18%). Owing to the non-aligned nature of many of the airlines in the sample, 98% of the examined liveries did not feature the markings of a global airline alliance such as oneworld or Star. Only 43% of the liveries carried a small rectangular image of the national flag of the country of origin on the rear of the fuselage and the liveries of only 23 of the 143 European operators included in the sample incorporated the European Union flag.

5. The influence of airline type

In addition to documenting the principal design features of 637 global liveries, the research also sought to determine the extent to which the nature of an airline's operation (full-service, low-cost, charter, regional, or cargo) and its geographic origin affected the visual content and design of the liveries. Disaggregating the dataset according to these parameters revealed subtle yet potentially significant differences between the visual content of the liveries. These differences are outlined in this and in the subsequent subsection.

5.1 Full service airlines

Owing to their relatively long commercial history, the liveries used by FSCs tended to be the most visually or aesthetically conventional. Many featured

the colours of the national flag (the notable exception here being the German national carrier, Lufthansa) or other primary colours and, on average, they used a higher number of different colours than other operators. 50% of FSC liveries used four or more colours compared with only 24% of charter operators. The basic fuselage colour of 88% of all FSCs was white (compared to 96% of regional airlines and 71% of low-cost operators). The most common secondary colours were blue, red, and green, and the most popular colour combination was white, red, and blue. Yet, irrespective of whether or not the livery featured the colours of the national flag, a higher proportion of FSCs than any other type of carrier featured a small depiction of the national flag somewhere on their livery (64% compared to 48% of cargo airlines).

The visual presentation of the typeface and the position of text also varied considerably by the type of operator with FSCs more likely to display their names in capital letters or sentence case than in lower case. Indeed, only 7% of FSC names appeared solely in lower case letters compared with 36% of LCAs. Such differences, although seemingly small, reveal much about how an airline perceives itself and also wishes to be perceived by external groups. The trend for using lower case, for example, is considered to be a relatively recent one and is perhaps associated with digital communication and innovation and therefore much more appropriate for a young and arguably more dynamic low cost airline that relies heavily on internet reservations than a full service one that has been operating for decades and markets its services as being based on tradition, precision, and customer service. However, while the case of the typeface did differ by airline type, there was no discernable difference between the proportion of normal and italicised typefaces used by the different types of operator.

In addition to these brand and aesthetic considerations, an airline's business model also affected the types of aircraft that were flown. This, in turn, directly affected the design features of their liveries in very obvious ways. Whereas the majority of FSCs, which predominately operate jet-powered aircraft, painted their name on the front of the fuselage above the main deck passenger windows, regional airlines, which often fly smaller, high-wing propeller-engined aircraft such as the ATR 42, Dash 8, and Fokker 50 displayed their name on the front *lower* portion of the fuselage to keep it away from the wing. For cargo operators, flying dedicated freight aircraft in which the passenger windows are often blocked out, the name would often cover the entire side of the front portion of the fuselage. For the same reasons, more FSCs than other types of airlines featured horizontal cheatlines (47% compared with 32% of charter companies and 19% of LCAs).

In addition to differences in the choice of colours, colour combinations, typefaces, and design features, there was also noticeable variation in the motifs that were applied to the tailfins of different types of airline (Table 1). The motif which appeared most frequently on the tails of FSC aircraft were birds (26%) followed by the airline's name (18%) and icons of motion (10%).

Table 1 - The most common tailfin motifs by type of carrier

	Most common	2nd most common	3rd most common	Number of categories represented
Cargo	Name (36%)	Bird (19%)	Motion (12%)	13/17
Charter	Name (34%)	Celestial (23%)	Birds (10%)	14/17
FSC	Bird (26%)	Name (18%)	Motion (10%)	17/17
LCA	Name (38%)	Motion (13%)	Bird (8%)	14/17
Regional	Bird (22%)	Name (21%)	Motion (11%)	17/17

5.2 Regional operators

The liveries of regional operators were more likely to feature white fuselages and script-like typefaces than any other group of carriers. Differences in the physical configuration of the airframes flown by regional operators also resulted in the airlines' names being positioned on the lower fuselage. Like FSCs, the most common tailfin motifs were those featuring birds, names, and icons of motion (Table 1).

5.*3 Low-cost airlines*

Whereas the colour choices of FSCs typically reflected those found in the national flag of their country of origin, the colour choices and colour combinations adopted by low-cost operators were typically less conventional and often employed striking combinations of non-primary colours such as purple, pink, and orange as well as lower case typefaces and more rounded 'cartoon like' characters. Curiously, however, while bright, the liveries of LCAs featured fewer individual colours overall. LCA liveries were the least likely to feature a white fuselage (only 71% did v 96% of regional airlines) and the least likely to sport a cheatline, possibly reflecting the fact that they are relative newcomers to the market and need to create unique and distinctive visual identities that convey and reinforce the notion that these airlines operate to a different set of business philosophies. LCA liveries were also distinctive in that they placed their name on the rear of the fuselage aft of the trailing edge wing root more frequently than any other type of operator. The most common tailfin motifs used by LCAs were the airline's name, icons of motion, and birds (Table 1). The fact that an LCA's name features so often on the tailfin is significant and suggests that even when aircraft are not employed as logo jets for external companies, the aircraft are effectively used as flying advertisements for the airlines concerned.

5.4 Charter operators

Like LCAs, the liveries of charter airlines were bright and often used non-primary colours such as pink, orange and light green to convey notions of sun, sand, and tropical vacations. They were the least likely to feature the airline's

name either in whole or in part (only 77% of charter airlines did compared with 86% of cargo operators). They were, however, far more likely to feature the airline's web address (73% compared with 7% of FSCs). Such differences may reflect the relative importance different airline business models place on web-based distribution channels. After the airline's name, the next most common category of tailfin motif was celestial icons which included depictions of the sun, earth, stars, and cosmos (see Table 1). Unlike FSCs and regional operators, there is arguably less imperative for charter operators to ground themselves in the territory of a single nation state (and, indeed, commercial imperative dictate that many charter airlines are now part of international travel consortia). This may go some way towards explaining why non country specific celestial motifs were more common among charter airlines than any other type of operator.

5.5 Cargo operators

The liveries of cargo airlines are distinguished by their relatively limited use of colour (two or three primary colours being the norm) and the fact that they are more likely to use very large typefaces featuring text in capital letters that is placed along the middle of the fuselage. Unlike passenger airlines, whose liveries must be distinctive and carry a corresponding consumer appeal, there is arguably less incentive for cargo airlines to invest considerable sums of money in designing intricate and expensive liveries.

6. The influence of world region

In addition to discovering differences in the visual content of full service, regional, low cost, charter, and cargo airline liveries, the geographic origin of an airline also affected the content and presentation of the livery. Each airline in the study was assigned to one of seven world regions according to its country of registration. Interestingly, and irrespective of the type of business model they pursued, airlines from Africa and the Caribbean and South America were the most colourful with 14% of all carriers from these two world regions employing five or more colours on their livery compared to only 2% of European operators. Other noticeable differences included the fact that Asian airlines were more likely to have non-white fuselages than African ones (41% compared with 5% respectively) and that more South American and Caribbean airlines (85%) liveries incorporated their name than North American airlines (67%).

Capital letters were most common among African operators (with 66% electing to use them compared with only 33% of Australasian airlines), while more European operators (19%) used lower case letters than South American and Caribbean ones (9%). Italics were more commonly used by Caribbean and South American operators than by Middle Eastern ones (46% compared to 24%) while a higher proportion of North American airlines used handwritten script. The highest percentage of airlines displaying their web address (27%) came from Europe and the lowest (7%) from the Middle East. Australasian

operators were the most visually patriotic – 75% 'flew the flag' somewhere on their aircraft compared with only 47% of African operators.

In terms of tailfin motifs – birds represented the biggest category in Asia, the Middle East, and Caribbean/South America, names were the most popular motif among African, Europen, and North American operators, while celestial icons were the most popular motifs in Australasia (Table 2).

Table 2 – The three most common categories of tailfin motifs by world region

	Most common	2nd most common	3rd most common	Number of categories represented
Africa	Name (27%)	Bird (23%)	Animal (9%)	16
Asia	Bird (31%)	Motion (14%)	Name (13%)	16
Australasia	Celestial (28%)	Name (22%)	Botanical (14%)	11
Europe	Name (30%)	Bird (17%)	Celestial (12%)	16
M. East	Bird (35%)	Name (14%)	Motion (10%)	12
N. America	Name (35%)	Motion (11%)	=Bird (10%) =Celestial (10%)	17
S. America and Caribbean	Bird (24%)	Celestial (19%)	=Botanical (15%) =Name (15%)	15

Botanical logos, such as palm leaves, flowers, and petals, were a common feature of South America/Caribbean and Australasian operators (accounting for 15% and 14% of all tailfin designs in those respective regions), while motifs depicting animals (such as native fauna including antelope and zebra) were most likely to be employed by African operators.

7. Discussion and conclusion

Airlines were among the first transportation companies to 'standardise their external presentation' and 'set themselves apart from the competition' (Eisenbrand, 2004, p145). Since 1919, airlines have sought to standardise the external and internal presentation of their company and brand through a set of continually recurring design characteristics. These deliberately planned corporate symbols include not only carefully selected colours and colour combinations, but also typefaces and visual motifs. From the mid 1960s onwards, the universal application of these visual corporate identities was defined in corporate design handbooks and they permeated all aspects of an airline's brand and service offering, from the markings applied to aircraft, to crew uniforms, ticket wallets, flight schedules, baggage tags, cabin furnishings, airport lounges and (more recently) corporate websites and social media platforms (see Eisenbrand, 2004).

The liveries that are applied to the world's commercial aircraft fleet

have to perform both a practical and an aesthetic purpose. They must protect the aircraft and also be instantly recognisable and trusted symbols of an individual airline in all the markets that that carrier serves. They must communicate core attributes of the airline's brand and appeal to particular customer demographics in a way that is culturally appropriate and alienates no-one. As such, the content and design characteristics of airline liveries reveal much about the countries, cultures, and corporations, that designed them.

In documenting and analysing the visual content of 637 airline liveries, this paper has not demonstrated the aesthetic diversity of airline liveries but it has shown that an airline's business model and its geographic origin affect the content and presentation of an airline's livery in ways that have hitherto been uncharted. Sometimes (particularly in the case of cargo and regional operators that fly particular types of aircraft), the presentation of a livery is dictated, to a significant degree, by the physical dimensions and shape of the airframes that are operated. In other cases, certain full service airlines act as the official or self-appointed 'flag carrier' of their nation and must metaphorically 'fly the flag' to all the destinations on their network. As a result, the livery must promote particular positive national stereotypes such as German efficiency, French flair, Scandinavian design, or Swiss punctuality.

Yet alongside such 'historic' or conventional liveries exist those of regional, charter, cargo, and low-cost airlines. These liveries have to fulfil subtly different functions and their liveries utilise a range of different design features to convey notions of regionalism, sun-filled vacations, global logistics, and cheap(er) airfares. Regional operators must engender notions of convenience, localism, and personalised customer service but at the same time employ a conventional design aesthetic. Charter carriers, on the other hand, typically employ bright(er) colours and different sorts of visual motifs to convey notions of sun, sea, and foreign vacations whereas low cost airlines seek to stimualte customer demand through the promise of lower airfares.

In addition to identifying the core design features and differences in the liveries used by different types of airline, the research also revealed that an airline's geographic origin also influences the design and content of its livery. Airlines from South America and the Caribbean, for example, typically employ far more colours than their European counterparts. These findings are significant for three reasons. Firstly, until now, there have been very few attempts to document the diversity and content of the liveries of multiple global air transport companies. The research has quantified the frequency with particular colours, design features, typefaces, and motifs are employed and, in so doing, documents the ways in which airlines visually differentiate and position themselves in the marketplace. Secondly, and uniquely, it identifies that the nature of an airline's business model and operational practices influence the choice of livery. Finally, it demonstrates how, almost irrespective of the type of airline, geographic origin influences the liveries of the world's airlines. By identifying the common design features and visual motifs and the factors that influence them, the research will enable graphic artists and design consultants to develop distinctive and innovative future

airline identities and enable transport academics, designers, geographers, and cultural commentators to debate the continued significance of place and national/regional identity in a supposedly 'borderless' and ever more globalised world in which air travel has become one of the defining modes of mobility.

8. References

Adams, F. M. and Osgood, C. E. 1973. A cross-cultural study of the affective meaning of colour. *Journal of Cross-Cultural Psychology* 4(2) 135-156.

Aslam, M. M. 2006. Are you selling the right colour? A cross-cultural review of colour as a Marketing Cue *Journal of Marketing Communication* 12(1) 15-30.

Chant, C. 1997. *Airlines of the World* London, Tiger Books International.

Chant, C. 2002. *The Pocket Guide to Commercial Aircraft and Airline Markings* London, Hamyln.

Christy, C. 1992. *Commercial Aircraft and Airline Markings* London, Chancellor Press.

Clark, A. 2010. United and Continental merge to create world's biggest airline Retrieved from http://www.guardian.co.uk/business/2010/sep/17/united-continental-merger-agreement on 28/11/2011.

Eisenbrand, J. 2004. *Airlines and Corporate Design* in von Vegesack A and Eisenbrand J (Eds.) *Airworld Design and Architecture for Air Travel* Weil am Rhein, Vitra Design 144-175.

Flack, J. 2003. *Airlines and Airliners* London, Harper Collins.

Henderson, D. K. 1997. Winning Ugly: Southwest Airlines' passengers may find its livery unsightly but their instant recall contributes to the carrier's unbridled success. *Air Transport World* 34(9) 66-68.

Henderson, P. W., Giese, J. L., and Cote, J. A. 2004. Impression Management Using Typeface Design *Journal of Marketing* 68(4) 60-72.

Leslie, T. 2005. The Pan Am Terminal at Idlewild/Kennedy Airport and the Transition from Jet Age to Space Age Design Issues 21(1) 63-80.

Lovegove, K. 2000. *Airline Identity, Design, and Culture.* London, Laurence King.

Lufthansa Technik. 2011. Corporate homepage www.lufthansatechnik.com Accessed 28/11/2011.

Middleton, D. 1986. *Civil Aviation. A design history.* London, Ian Allan .

Taylor, M. J. H. 1997. *The World's Commercial Airlines. An illustrated History of the Airlines and their Insignia* London, Regency House Publishing

Thurlow, A. and Aiello, G. 2007. National pride, global capital: a social semiotic analysis of transnational visual branding in the airline industry *Visual Communication* 6(3) 305-344.

Yarwood, A. 2000. British Airways World Images Farewell *Airliners* 13(6) 25-43

Zukowsky J (Ed.) Building for Air Travel Architecture and Design for Commercial Aviation The Art Institute of Chicago Munich, Prestel.