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## Miscellaneous

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**Javier Jiménez Valero**

<https://orcid.org/0000-0003-3142-5151>

[jjvalero@ufv.es](mailto:jjvalero@ufv.es)

Universidad Francisco de Vitoria

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## Impact of technical and artistic media on historical rigor of the air combat film productions

### Abstract

This article explains how the technical and artistic means used in the production of air combat cinema have a direct impact on the historical rigor of these films. Through the analysis of 180 productions of this subgenre, a study has been made of these techniques and their evolution over time, as well as the impact they have had on the historical rigor of the films in which they have been used. Obtaining, as a result, a global vision of the suitability of the technical and artistic solutions that this type of cinema has used to represent History in audiovisual format.

### Keywords

**History, cinema, war, air combat, special effects.**

### 1. Introduction

War films are one of the cinematic genres that requires the most extensive use of special effects. In the words of Eustace Lycett<sup>1</sup>, special effects comprise: “any technique or device that is used to create an illusion of reality in a situation where it is not possible, economical, or safe to use the real thing” (Culhane, 1981, p. 4).

Filming battle sequences, by its very nature, involves risk, and this grows as the desire for historical faithfulness increases. This risk is especially high in the subgenre of aerial combat owing to the use of planes. To reduce the danger of this type of production, a variety of cinematographic techniques and special effects have been used, developed by specialists who use safer materials, such as fire-proof suits, blank bullets and controlled explosions.

The wars of the 20<sup>th</sup> century, that are the object of study here, involved large-scale deployment of materiel and personnel, and depicting this on the big screen requires considerable work on staging and characterisation for each sequence.

This study analyses how technology has developed over the years to depict aerial combat on screen and how this development has affected the realism and historical accuracy of these productions. The techniques we consider have been used and combined with others throughout the history of this subgenre. Some have been around since the start of medium, such as use of real planes, while others have fallen from use, and been replaced by more modern computer-generated imagery (CGI).

Budget is a fundamental aspect of this type of production, and usually marks the difference between different productions from the same period. Similarly, the level of detail and precision that current technology allows highlights the achievements of early

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<sup>1</sup> Lycett was the head of photographic special effects at the Walt Disney Studio, winning two Oscars for best special effects for *Mary Poppins* (Robert Stevenson, 1964) and *Bedknobs and Broomsticks* (Robert Stevenson, 1971) and garnering a nomination for *The Assent-Minded Professor* (Robert Stevenson, 1961).

productions, as well as drawing attention to the seriousness of errors in some more recent ones.

### 1.1. *State of the question*

Use of special effects is intrinsic to the medium of film. Making films through photography is a special effect in itself. Shooting, developing and printing the footage, montage, and so on are all techniques that help create an illusion of reality. However, tricks in photography (later known as visual effects) started to be differentiated from the artifices typical of the medium of film on the basis of the work of pioneers such as Georges Méliès. In the 20<sup>th</sup> century, this led to the conception of special effects as something technical, more typical of the medium as an industry than the work as a piece of art.

Since the 1950s, there have been numerous publications about special effects, which have been updated over time as techniques have evolved. As Rama Venkatasawmy (2012, p. 44) notes, the topic is normally approached either from a highly technical perspective, aimed at professionals in the field<sup>2</sup>, or from a more explanatory perspective when experts or industry veterans rewrite these materials for a more general readership<sup>3</sup>. To a lesser extent, there are works that consider the question from the point of view of the contribution of special effects to the aesthetics of the film and its artistic characteristics<sup>4</sup>.

These texts generally limit themselves to describing the techniques and how they are applied, without relating the special effects to history. Only what David Robinson calls “the historiographical aspect of cinema”<sup>5</sup> (Cited in Rueda, 2015, p. 445) takes an interest in the technological history, presenting an evolutionary model that follows the linear sequence of inventions and innovations that have inspired the historical changes to film<sup>6</sup>. However, these authors do not consider how the techniques and special effects used in film can affect the historical accuracy of productions.

In recent decades the relationship between film and history has been an important area of research, usually focussing on the medium’s capacity to represent history and on the role that this medium can play in the sharing of history<sup>7</sup>. On the one hand, there are opinions that argue that the cinema does not have such a capacity and that, therefore, no responsibility can be demanded of it when it comes to representing history. On the other hand, there are authors who defend that it is able to do so, if the cinematographic language and its characteristics are taken into account when doing so. Among these defenders, beyond the authors from the academic field, are many producers and directors who care about history and the responsibility that historical cinema has as a means of disseminating it. For this reason, in their productions they collaborate with historians and experts to be able to accurately represent history without neglecting the entertainment component that cinema comprises<sup>8</sup>.

This article forms part of this line of research. Starting with a representative sample of the subgenre of aerial combat, it shows how the techniques used affect the accuracy with which the filmmakers recreate the past. The results of this analysis can be extrapolated to war films in general, given the similarity of the production processes.

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<sup>2</sup> Notable examples of the many works on this matter include Bulleid (1954), Clark (1966), Bau (1968), Fielding (1972), Hayes (1986), Phillips and Ohanian (1996), Brinkmann (2008), Venkatasawmy (2012), and Okun and Zwerman (2020).

<sup>3</sup> There have been numerous examples over time. Notable ones include Fry and Fourzon (1977), Culhane (1981), Abbott (1984), Hutchison (1987), Scott (1995) and McClean (1998).

<sup>4</sup> Other examples should be noted, such as McKenzie and Ware (1986), Millar (1990), Hall and Codrington (2000) and Pierson (2002).

<sup>5</sup> Own translation.

<sup>6</sup> Examples of this type of focus include Brosnan (1974), Piyán and Piyán (2001), Netzley (2001) and Rickitt (2007).

<sup>7</sup> Authors who have worked on this line of research include Sorlin (1991, 2005), Davis (2000), Burke (2005), Ferro (2008), Caparrós (2008), Paz and Montero (1995, 2013), Rosenstone (2014), Montero (2015), Salvador Ventura (2015), and Nigra (2019).

<sup>8</sup> *The Tora! Tora! Tora!* (Richard Fleisher, Toshido Masuda and Kinji Fukasaku, 1970) case is paradigmatic in this regard, as can be seen in the work Jiménez Valero (2021).

## **2. Methodology**

Based on the fact that it is indeed possible to tell history in audiovisual format, it can be done with different levels of accuracy. There are productions that are capable of narrating and explaining historical events clearly and that even allow the viewer to learn history. Others, meanwhile, may commit serious errors, which can lead the viewer to be confused or harbor misconceptions about what happened in the past.

Many factors affect the historical accuracy of a film production. Some, like the point of view from which the subject is approached, the profundity with which the events are treated, or the importance given to each one in the narration are the same conditions that historians themselves encounter when telling history in written form. However, there are others that are typical of the audiovisual medium, such as the editing, the length of the footage, the resources, the available budget, etc. Representing accurately aspects such as the characters, their words, their gestures, even their accents and ways of speaking; the staging of scenes, vehicles, costumes, props, etc. does not generally require the use of significant technical resources as it can be achieved by consulting historians and specialists and doing a good job of production. Nonetheless, war films require complex technical and artistic methods to make it possible to recreate action scenes, battles and explosions, or simply retrieve constructions and scenarios from the past that no longer exist or are hard to find and to work with them.

Accordingly, war films are a perfect area of study to observe how much these technical and artistic means affect the historical accuracy of films and as a result the ability to create works that can spread accurate historical knowledge. Given the large number of war-films made throughout the history of film, and with the aim of carrying out a detailed study of the question, this research is limited to the aerial combat subgenre.

Within this subgenre, a broad sample of 180 productions from different countries has been selected for analysis (Appendix 1). Considering all those productions where aerial combat is the protagonist or where it at least has a significant importance in the work, an attempt has been made to reach the largest number of films available that meet these characteristics. Therefore, almost all the material available on home video has been accessed, but efforts have also been made to find those that are more difficult to obtain. To this end, some important film libraries were visited, such as the Spanish Film Library or those of the American Film Institute and the Universities of UCLA, USC, CalArts, Berkeley or Stanford during a research stay in the state of California in the United States.

These are the most representative films of this subgenre from its beginnings in the late 1920s to the present day. It includes both the most awarded and critically recognized films as well as some that seem to have been forgotten in the archives of film libraries. The vast majority are films of American origin. This is due both to the fact that Hollywood is the largest film industry in the world since the beginning of the 20<sup>th</sup> century, and to the fact that the United States has been involved in many conflicts where the airforce has been the protagonist and, therefore, it is normal that this powerful industry has used historical themes of interest to their country in their productions.

In this analysis, the historical topics that each production covers are identified and studied, taking into account the period and historical setting in which they were created, the intent of their creators, their budget, the technical and historical advisors they had and the relationship in the film between history and spectacle or the complexity of the events they try to represent.

Thus, in this type of production, two types of historical errors can mainly be identified: historical errors derived from the lack of documentation on the part of the producers and historical errors derived from technical failures, which apart from influencing the final quality of the film, often also have an impact on its historicity. This study focuses on analysing

the latter, observing their functioning and their degree of influence when representing history in the cinema.

Most of the historical errors of this type of cinema are due to anachronisms and incorrectness in the planes, squadrons, vehicles and materials (very common, especially when digital technology did not exist, due to the lack of budget to obtain planes of the period or make replicas). These errors are generally the least relevant for the transmission of historical concepts. Therefore, the films that contain these errors are included in the categories of medium or high rigor of the classification.

However, the lack of credibility in air combat (this may be due to the impossibility of maneuvering, the exaggerated percentage of hits in shots or the number of shots fired, through the number of units of the forces involved, to confrontations that could never take place in a war scenario, either because of the protagonists or because the planes shown are much more modern than those of the moment being represented, etc.), the invention or omission of events, as well as the chronological lag of the same without a justification due to narrative cinematographic criteria and the distorted representation of historical characters, are errors that distort reality and form erroneous ideas about history in the spectators and, therefore, the films that contain these errors are included in the categories of lower rigor of the classification.

Therefore, according to these criteria, a rating is obtained for each film taking into account its ability to spread historical knowledge through its images and the techniques used. Seven categories are used, ranging from very high to very low and reflecting the historical accuracy of these productions:

- Very high: contains almost no historical errors, the setting and the planes are correct and it is a very good historical dissemination document.
- High: contains very few historical errors, some minor errors can be found in the setting and in the planes and it is a good historical dissemination document.
- Medium-high: contains some historical errors, but of little seriousness for the general understanding of History. There may be interesting parts such as a historical dissemination document.
- Medium: contains historical errors, some rather serious, that can mislead the viewer when it comes to understanding history. Sometimes there are anachronisms and errors in the setting or the characters.
- Medium-low: contains many historical errors, many of them can mislead the viewer when it comes to understanding History. It is common to find anachronisms and errors in the setting or the characters.
- Low: Contains many historical errors that cause the viewer to draw wrong conclusions about history. Many of the major elements of the film are anachronistic, and the errors in setting or characters are serious.
- Very low: Contains such serious historical errors that it makes it highly difficult to understand history, leading the viewer to false or erroneous conclusions. Historical errors of all kinds are constant.

Content analysis is then used to analyse the techniques shared by all of the war film genre, such as, real planes and aerial photography, life-size replicas and models and the use of footage from other films and archive images. The use of backprojection and frontprojection are also studied. These were commonly used in all genres of film for years and are especially important in films featuring air battles. Finally, computer-generated technology, or CGI, is analysed.

Thus, considering those productions where the use of these techniques is significant, it has been possible to ascertain their degree of responsibility for the inherent historical errors or, on the contrary, if they contribute to improving their historical rigor.

Based on the statistical analysis of the data derived from this research, several conclusions can be drawn regarding the suitability of each technique when representing history in audiovisual format.

### **3. Planes and pilots**

Until modern computer-generated imaging technology emerged, aerial combat films needed real planes or life-size or miniature replicas to recreate this type of action. The first productions in the aerial combat subgenre started to be made almost a decade after the end of the First World War and so finding planes from that period was not easy. This made it necessary to draw on collectors or search forgotten stores and aircraft cemeteries, with the aim of restoring the planes so that they could fly again safely. Visionaries like Paul Mantz were able to anticipate the needs of the market and offer different models of aircraft for productions with their services as pilots and technical advisers. He gradually created a small force of historical aircraft and aircraft for filming from, adapted with camera mounts and space for the camera operator (Dwiggins, 1967). But Mantz's concern with historical accuracy largely depended on his business interests. For example, in *Fighter Squadron* (Raoul Walsh, 1948) he was unable to find Messerschmitt Bf-109s that could fly and so he decided to use North American P-51 Mustangs, the most recognisable US fighter of the Second World War, in their place, claiming that there was some resemblance (Orriss, 1984, pp. 77, 136, 137).

Productions in this subgenre used qualified pilots for the most complex scenes. These pilots risked their lives in every take, doing dangerous passes in front of the camera and performing controlled crashes. We should mention Dick Grace, one of the most important specialists in these first years. Nonetheless, safety measures were gradually introduced that would help reduce the risk for these pilots, such as fitting better safety belts, softening the ground where simulated accidents were to take place and reinforcing cockpits with metal bars, as well as always having a medical team and rescue team on every film set to take care of pilots immediately after extracting them from the remains of the plane (Farmer, 1984, p. 36; Mallory, 2014).

In this way, aerial combat scenes reached a level of spectacle and accuracy never before seen on the big screen, boosting the popularity of this subgenre and improving the value of these films as a source of historical dissemination.

### **4. Aerial photography**

In aerial combat films, the planes are the main protagonists, but to obtain realistic and spectacular images of them it is very important to work on how the images are taken.

Aerial photography procedures were first developed in *Wings* (William A. Wellman, 1927). Until then, the only attempts had been very rudimentary, with the camera positioned on the ground to film action that took place above it, while close ups were faked with the plane on the ground or on a platform, using low-angle shots of the pilots so that the ground was not visible. William Wellman and his cinematographer, Harry Perry, were the first to tackle the problem of aerial photography seriously. After several attempts to film action in the air from another plane using a hand-held camera, Wellman and Perry decided it was necessary to make special supports to attach the cameras to the fuselage of the planes, as the constant movement of the aircraft and the force of the wind made the operator's task of controlling the camera impossible. They also built some thirty-metre-high platforms from which to film shots of low-flying planes (Wellman Jr., 2006, pp. 118-121).

The young director, aged just twenty-nine, tested the patience of the Paramount executives by deciding that he would not fake any takes, and so the starring actors themselves –Buddy Rogers and Richard Arlen– had to take flying lessons and learn to pilot the planes. The camera was fitted in the nose of the plane pointing towards the pilot and the action was filmed facing backwards, thus showing the protagonist and everything that happened behind

his aircraft. Buddy Rogers described it like so: “I was the photographer, the director, the actor, everything... for five hundred feet” (Wellman Jr., 2006, pp. 118–121). Meanwhile, Richard Arlen explained how they did it:

We were using the first motor-driven cameras which were mounted a little in front of the cockpit. The 400-foot reels ran off at about 90 feet a minute which gave us only a little more than four minutes of picture. Bill Wellman would tell us on the ground what he wanted us to do in the air. We would waggle our wings when ready and then take over as a producer, director and actor. We would hold up a proper number of fingers for takes one, two or three. If we thought the scene was bad, we would run a finger across our throats for a cut. That was why Wellman wanted actors for *Wings* who could fly. “Buddy” (Wings costar Charles ‘Buddy’ Rogers) couldn’t but he learned damn ‘quick! (Farmer, 1984, p. 36).

After the aerial photography work of Harry Perry and William Wellman in *Wings* (1927), directors started to have access to technicians who specialised in this sort of work. For example, Paul Mantz and the camera operator Elmer G. Dyer formed a team that combined with great precision Mantz’s abilities as a pilot and Dyer’s technical experience.

In the 1940s and 50s they were responsible for shooting most of Hollywood’s airborne productions. Mantz also developed and modified various planes for use as filming platforms. These planes had various windows and mounts for different cameras to make filming from any part of the plane easy (Dwiggins, 1967; Farmer, 1984; Orriss, 1984, pp. 19–23; McClain, 1996).

Thanks to the camera mounts, the planes and the skilled work of the pilots and the camera operator, the scenes Wellman shot had a level of realism and spectacle that revolutionised the genre and, in 1929, led to him winning the first Oscars for Best Picture and Best Engineering Effects.

## **5. Replicas and models**

If a film’s budget allows and there are no existing period aeroplanes available for the filming, exact replicas of the aircraft are often used. This is not especially difficult with planes from the First World War as, apart from the engine and a few other metal components such as control cables, guns and fuel tanks, most parts of the planes were made from wood and fabric. The Fokker Dr.I and D.VII from *The Blue Max* (John Guillermin, 1963) or the Nieuport 17 from *Flyboys* (Toni Bill, 2006) are examples of planes built expressly for shooting a film.

Another suitable solution that is not as costly as building a plane from scratch, is modifying an existing plane to look like the desired one. This is what was done brilliantly in the film *Tora! Tora! Tora!* (Richard Fleisher, Toshido Masuda and Kinji Fukasaku, 1970), where various training planes that were very common in air forces all around the world were used to recreate Japanese planes, which had almost all been destroyed during the Second World War. Parts of the cockpit and engine fairing were modified so that they looked almost identical. In this way, painted in the colours of the Japanese Imperial Navy, it is hard for the untrained eye to spot the differences.

Another frequently used method of recreating a plane from the past is to take a plane that looks like the desired one and simply decorate it with the colours of the period. This technique does not generally give good results unless the aircraft are almost identical, as in the case of *The Star of Africa* (*Der Stern von Afrika*, Alfred Weidenmann, 1957); owing to the impossibility of finding Luftwaffe aircraft in flying condition, this Hispano-German production used Hispano Aviación HA-1112 Buchóns of the Spanish Ejército del Aire, a Spanish version of the Messerschmitt Bf-109, built under licence. Thanks to Harry Saltzman, the producer of *The Battle of Britain* (Guy Hamilton, 1969), who bought the last examples of these aircraft from the Spanish government, it has been possible to use these planes over the years in many other productions (Image 1), some as recent as *Dunkirk* (Christopher Nolan, 2017).

**Image 1:** Still from the film *The Battle of Britain* (1969) of various Hispano Aviación HA-1112 Buchóns.



Sometimes, given the difficulties of finding or fabricating modern planes or planes from hostile powers, very similar planes are used, with their differences going unnoticed by viewers, as in the case of *The Hunters* (Dick Powell, 1958), where US Thunderjets were used as Russian Mikoyan-Gurevich MiG-15s.

In these cases, the differences with real planes are minimal and do not cause any problems with representing the historical events accurately. Problems arise when the planes used are nothing like the real ones, either thanks to a lack of budget or because of a lack of concern with accuracy by the directors and producers.

In low-budget films there is no alternative to using ingenuity and some errors can be justified. However, productions like *A Guy Named Joe* (Victor Fleming, 1943) and *Fighter Squadron* (1948), with large budgets and people of the standing of Paul Mantz, entrusted with the aerial direction and with supplying the aircraft, display a lack of interest in historical accuracy.

One notable example of a lack of coherence can be found in *From Hell to Victory* (*De Dunquerque a la Victoria / Contro 4 bandiere / De l'enfer à la victoire*, Umberto Lenzi, 1979), where the British planes are German and the German ones are British. So, the Messerschmitt Bf-109, the most emblematic German plane of the Second World War, plays the role of a British fighter, and the Supermarine Spitfire, an icon of the United Kingdom, stands in as a German fighter. Even in the sequences filmed using models, where every detail of the production can be controlled, the German planes are Spitfires with Luftwaffe markings (Image 2).

**Image 2:** Still from the film *From Hell to Victory* (1979) of a model of a Supermarine Spitfire used as a German fighter with Luftwaffe markings.



Finally, the cheapest solution for filming aerial sequences is to use miniatures. There are many types of miniature, from the simplest cable-controlled models from the early years to bigger and more complex radio-controlled ones.

As well as the planes used for filming aerial sequences, most productions also need planes for staging scenes and filling the background in shots. These planes do not necessarily have to be able to fly and so real ones that are not in flying-condition are normally used, usually borrowed from museums or aeronautical institutions. Other times, life-size replicas are built using cheaper materials.

This is the case of the Supermarine Spitfires in *The Battle of Britain* (1969) or in *Dark Blue World* (*Tmavomodrý svět*, Jan Sverák, 2001), many of which were wood and fibreglass replicas, with a lawnmower motor to turn the propeller. These replicas were not capable of flying but they could move around the airfield with someone in them and even do simulated take-off runs. Many of these replicas and models are used to depict accidents and explosions as these would otherwise be very expensive.

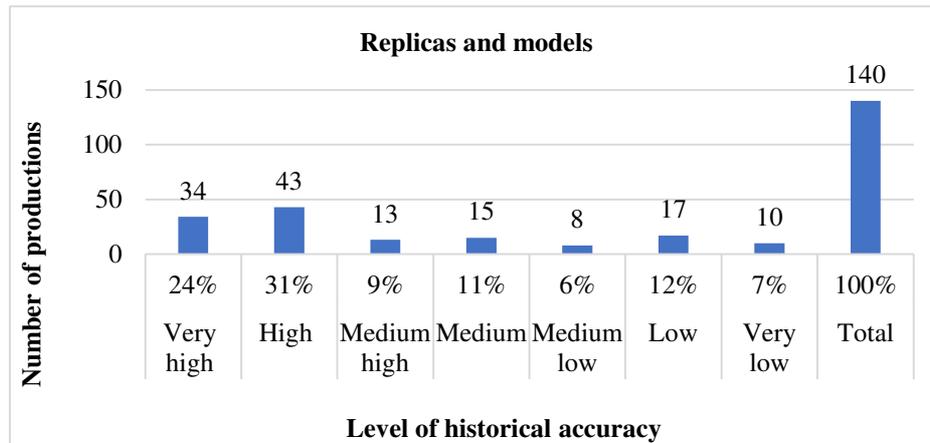
As well as replicas, there are other techniques for filling backgrounds, which while not being very widely used, are of interest thanks to their ingenuity and good price-effectiveness ratio. This is the case with matte painting where the image that is to be added to the background is painted on a sheet of glass placed in front of the camera, or with the use of silhouettes of planes made from wood panels. However, it is hard to make this effect look good. In *The Tuskegee Airmen* (Robert Markowitz, 1995), it is clear that the aircraft in the background are panels and not real planes (Image 3).

**Image 3:** Still from the film *The Tuskegee Airmen* (1995) where wooden panels representing aircraft can be seen (at the back). The North American P-51 Mustangs in the foreground are real.



Of the 180 productions analysed, 140 use replicas and models to reproduce combats. They can be classified as follows with regards to their historical accuracy:

**Figure 1:** Relationship between the number of productions in the study that use replicas and models and their level of historical accuracy.



Source: Own elaboration.

Of the 140 productions, 77 display high or very high historical accuracy, representing 55% of the total, 36 productions have medium historical accuracy, representing 26%, and 27 have low or very low historical accuracy, making up the remaining 19% of the total. This means that over half of the films that use this technique have high or very high historical accuracy, suggesting that these techniques have been useful to represent the history of aerial conflicts in audiovisual format.

## 6. Backprojection and frontprojection

The work in *Wings* (1927), with actors who were able to fly planes themselves, is an exceptional case<sup>9</sup>, which showcased the value of aerial combat film as a cinematographic subgenre. But what was at that time very difficult, in a few years became commonplace thanks to the development, in 1931, of the backprojection or retroprojection technique. This involved placing a translucent screen behind the actors and projecting moving images onto it from behind that served as a backdrop for the action.

This became one of the most widely used techniques in the 1930s and 40s and remained in use until the late 1960s. Directors used it for all sorts of sequences, not just those where it was necessary owing to the complexity of the take or the risks it involved. For air combat films this was a very useful technique, as it made it possible to film shots of planes flown by specialists separately before combining them with studio close-ups of the leading actors<sup>10</sup>.

The problem with this technique was the poor use producers made of it; to save money, instead of projecting their own images specifically filmed for the production, they started to use footage from other films, newsreels or documentaries, without taking into account the match-cut errors this might cause or the historical errors caused by mixing images with planes from different periods, battles and air forces. This caused so much chaos that it was sometimes hard to follow the action without getting lost.

To solve some of the problems of the complicated backprojection system, frontprojection was developed. This required much less space because the backdrop reflected all of the light reached it back in the direction it had come from and so the shadows that objects and actors cast were hidden behind them.

<sup>9</sup> Although it is not the only case. For example, in *Crimson Romance* (David Howard, 1934) the lead actor, Ben Lyon, was an experienced pilot in real life (Orriss, 2013, p. 87).

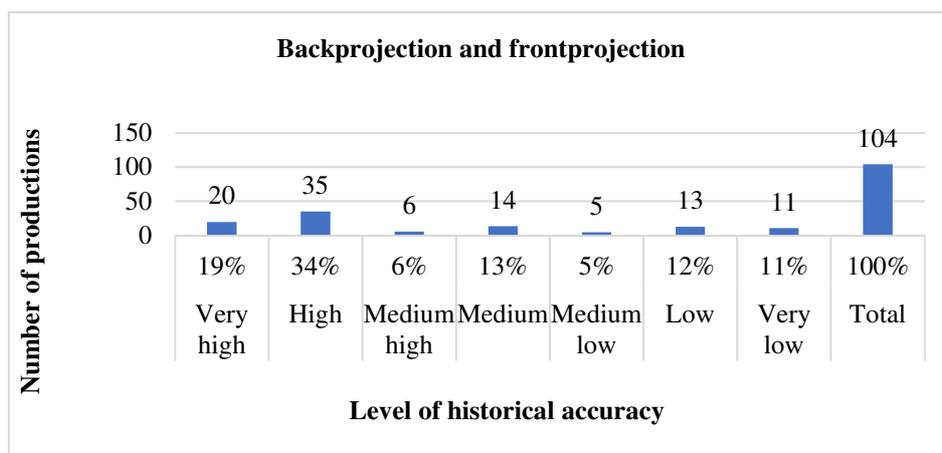
<sup>10</sup> One of the leading specialists in this technique was Farciot Edouart, who along with Gordon Jennings won the Oscar for best special effects in 1942 for his backprojection work in the air war film *I Wanted Wings* (Mitchell Leisen, 1941).

This technique was developed in the 1960s, but it was not until *2001: A Space Odyssey* (Stanley Kubrik, 1968) that it was used for the first time in a major film. Other films such as *Tora! Tora! Tora!* (1970) and *The Battle of Britain* (1969) also used this technique with good results.

Frontprojection and backprojection coexisted for several years until both techniques were completely abandoned in favour of the use of chroma key and computer-generated imagery technology.

The analysis of all 104 films from our sample that use this technique is shown in the figure 2:

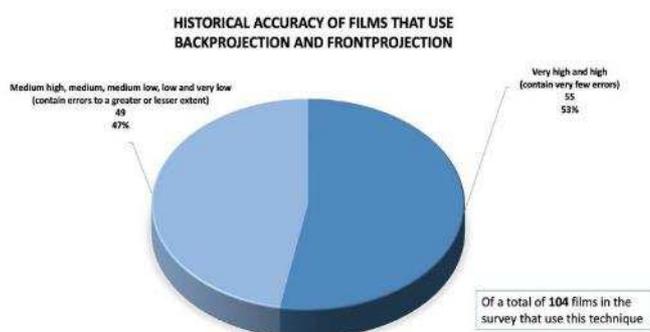
**Figure 2:** Relationship between the number of productions analysed that use backprojection and frontprojection and their level of historical accuracy.



Source: Own elaboration.

Considering films with high or very high historical accuracy on the one hand and ones that contain more or less serious historical errors on the other, the figure would be divided into two blocks, with more than half of the films that use these techniques featuring high historical accuracy and less than half including more or less serious historical errors.

**Figure 2.1.:** Relationship between the number of studio productions that use backprojection and frontprojection and their level of historical accuracy, grouped by those that hardly contain errors and those that contain them to a greater or lesser extent.



Source: Own elaboration.

Of the 49 films that contain historical errors, most owe their lack of accuracy to misuse of the projected archive images and not so much to the technique itself.

Finally, of the 24 that display low or very historical accuracy, 11 are propaganda and intended to shape public opinion, which would to some extent explain this lack of accuracy. Therefore, 13 films remain with low or very low historical accuracy that can be attributed to this technique, representing just 12% of the total.

From this we can deduce that the use of these techniques has not had a large influence on the historical accuracy of the productions, but that this accuracy instead depends more on how the technique is applied than on the technique itself.

## **7. Footage from other films and archive images**

Given the complexity of filming aerial warfare, many productions without a large enough budget to produce their own images chose to borrow them, either to recreate all of the combat sequences in the film or to complement the shots they were able to film.

The most notable productions of the 1930s, such as *Wings* (1927), *Hell's Angels* (Howard Hughes, 1930), *The Dawn Patrol/The Flight Commander* (Howard Hawks, 1930) and *Men with Wings* (William A. Wellman, 1938), were used to complete many other lower-budget films from the period, such as *The Eagle and the Hawk* (Stuart Walker, 1933), *Sky Devils* (Edward Sutherland, 1932), *The Story of Vernon and Irene Castle* (H. C. Potter, 1939), *Crimson Romance* (David Howard, 1934), etc. As late as 1958, William Wellman would use footage from his own work in *Men with Wings* (1938) in his last film, *Lafayette Escadrille*.

The most characteristic example of this technique is the remake of *The Dawn Patrol* (1930), also called *The Dawn Patrol* (Edmund Goulding, 1938), where the director rerecorded all of the shots that the stars appeared in while keeping the aerial sequences shot by Howard Hawks eight years earlier.

From the Second World War onwards, footage from real images filmed in combat was most often used<sup>11</sup>. But the shift to colour complicated its use and obliged these low-budget productions to seek new quality cinematographic works, such as *The Battle of Britain* (1969) and *Tora! Tora! Tora!* (1970).

*Mosquito Squadron* (Boris Sagal, 1969) and *The Thousand Plane Raid* (Boris Sagal, 1969) use part of the footage from *633 Squadron* (Walter E. Grauman, 1964). Likewise, the TV-movie *The Tuskegee Airmen* (1995) had to use images from *Memphis Belle* (1990) and *The Battle of Britain* (1969). The work from the aerial scenes from *The Battle of Britain* (1969) is so impressive that its images have been used to complete aerial combats scenes as recently as *First Light* (Matthew Whiteman, 2010).

Nonetheless, this technique normally entails serious match cut and continuity errors. The difference in quality between shots recorded by the studio in the production and shots added from other works or documentaries is often very apparent, especially in footage from the battlefield, which was often taken under very difficult conditions, where the lighting and camera movements are not always appropriate. Furthermore, these recordings were not intended to form part of a cinematographic work, but instead were supposed to be military resources for the work of the intelligence services or for training soldiers, and so the film used is usually not of the desired standard of quality for commercial projection. Unless great care is taken, it is very hard for archive images to fit in with the original footage. In any case, the greatest problem is often that the aircraft that appear in archive footage or other films often do not match the ones in the images recorded by the studio.

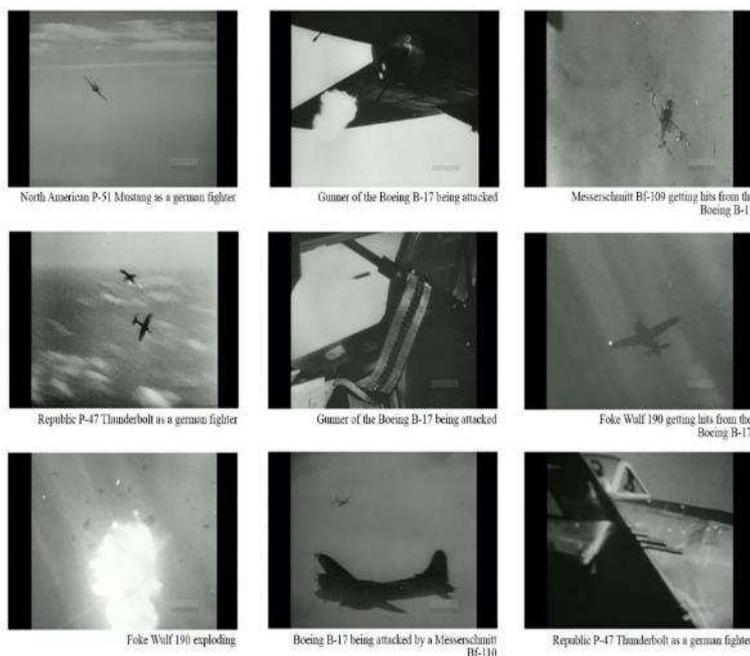
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<sup>11</sup> Thanks, above all, to the large quantity of images of this type that were filmed by the audiovisual production services of the air forces involved such as *The First Motion Picture Unit* (FMPU) of the US Army Air Forces, directed by Paul Matz; the *Photographic Unit for the Office of Strategic Services* of the US Navy, directed by John Ford and the *Royal Air Force Film Production Unit* (RAFFPU).

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Another very common practice is to use long shots of other planes –normally film of Allied planes– to represent Axis planes, as for example in *Twelve O'Clock High* (Henry King, 1949) or *The Thousand Plane Raid* (Boris Sagal, 1969), where archive images of US Republic P-47 Thunderbolt planes were used to represent German Messerschmitt Bf-109s. Likewise, in the series, *12 O'Clock High* (1964-1967), the German fighters that participate in the attack on a B-17 bomber include five different models of aeroplane (Image 4). Two of these models are correct, the Messerschmitt Bf-109 and Focke-Wulf Fw 190, German interceptors entrusted with defending Germany's skies during the day. However, Junkers Ju 88 Stukas also appear. These did not attack heavy bombers at high altitude but instead were used as flying artillery, destroying tanks and attacking enemy ground troops. Messerschmitt Bf-110s also feature, a heavy twin-engine fighter that was no longer used after the Battle of Britain as its inferiority to other single-engine fighters became apparent. Finally, British Supermarine Spitfires, which were Allied aircraft, also appear, and some shots even show Japanese aircraft, even though the action is set in Europe.

**Image 4:** Stills from episode 3 of the first season of the series *Twelve O'Clock High* by Quinn Martin called The Men and the Boys, where the montage of real archive images causes historical and match cut errors.



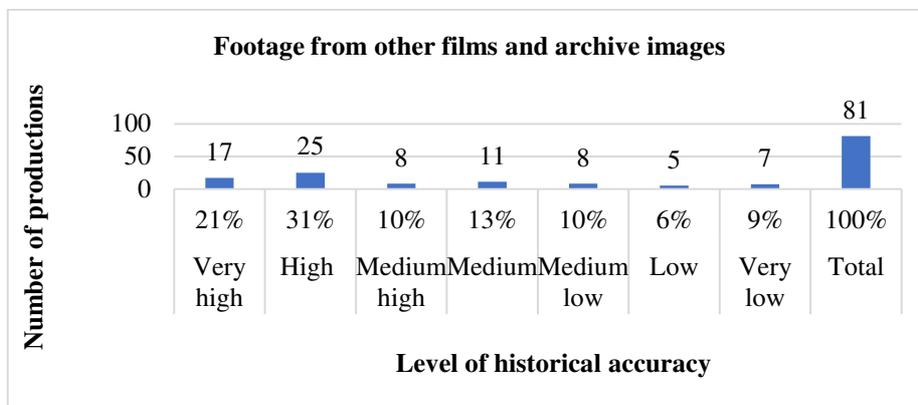
Source: Own elaboration.

This practice is unacceptable, even if it does go unnoticed by non-expert viewers. The huge amount of archive footage in existence from the Second World War makes it possible to find and select footage featuring aircraft that are historically appropriate for the narration. Therefore, although the quality of the work falls with the use of this technique, a certain effort in documentation could maintain its historical accuracy.

During the late 1960s and the 1970s, this technique tended to disappear and producers made efforts to try to reproduce the aerial combat sequences themselves. Nonetheless, even in the 1990s we can find productions that use archive images to recreate combat, as in the case of *Memphis Belle* (1990) or *The Tuskegee Airmen* (1995).

The level of historical accuracy of the 81 films from the total sample of our study in which this technique is used is shown in Figure 3.

**Figure 3:** Relationship between the number of productions in the study that use footage from other films and archive images and their level of historical accuracy.



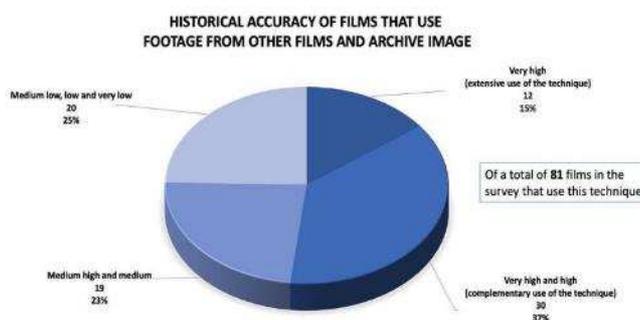
Source: Own elaboration.

Despite the challenges of using this method, it is clear that there are very few films with low or very low historical accuracy, just 15%. Even combining the ones with medium low, low and very low historical accuracy only gives 20 productions out of 81 –25%– with major historical errors.

Furthermore, taking into account the intent of the productions, we can see that of the 22 productions that are propaganda intended to influence public opinion, only 6 have low or very low historical accuracy, and so, in this case, lack of historical accuracy cannot be attributed to possible propaganda bias.

On the other hand, of the 42 productions with high or very high historical accuracy, only 12 use this technique almost exclusively to depict aerial combat. That is to say, in 15% of films, a careful effort has put into the search for, selection and montage of archive images so that the technique contributes decisively to showing events with historical accuracy. The other 30 do not use this technique on a large scale, but instead use it to complement original footage in sequences, with no significant effect on the historical accuracy of the production.

**Figure 3.1.:** Relationship between the number of productions in the study that use footage from other films and archive images and their level of historical accuracy.



Source: Own elaboration.

Consequently, we can conclude that this technique does not have a major effect on the historical accuracy of productions, as it is mainly used to complement other techniques, and when it is used on a large scale, the result largely depends on the directors' care and effort in documentation and searching for the correct images for the technique to work. Nonetheless, in most of the films, its use is counterproductive from an artistic and visual perspective, and it can be argued that this technique is not ideal for representing aerial combat audiovisually.

## **8. Computer-generated imagery (CGI)**

There are many computer-generated imaging techniques: from the first chroma keys in the 1980s, to the most recent modern 3D recreations. This technique has developed exponentially in recent decades as the processing power of computers has increased. And, as in any cinematographic process, the end quality of the effect depends greatly on the production time and money invested.

The aerial combat subgenre used chroma in the 1980s and 90s. Films like *Flight of the Intruder* (John Milius, 1991) and *Memphis Belle* (1990) use this technique with good results. However, chroma, only made it possible to do some effects to complete images filmed using planes and real models. Since the start of the 21st century, this type of production has habitually used CGI. The first film from this subgenre to use CGI on a large scale was *Pearl Harbor* (Michael Bay, 2001), as with 3D animation it makes it possible to create all of the action in a sequence entirely artificially with no need to film with real planes, thus enabling complete control of the elements that are recreated, with a consequent increase in the chances of obtaining a result that is historically accurate and faithful.

As a result, filmmakers are now increasingly starting to use this technology, which can combine scenes previously created on computer with images captured by the camera in real time, adjusting the scene automatically to the movements of the camera operator, as the action is filmed.

Although the possibilities of CGI are unlimited, for the end result to be good, a lot of time is needed for this technology to work as all of the design of the scene (models, lighting, etc.) has to be processed by a rendering engine, which, regardless of its power, takes more or less time according to the volume of data it has to process.

For this reason, the end result in films like *Fortress* (Michael R. Phillips, 2012) or *Angel of the Skies/Wings of Honour* (Christopher-Lee dos Santos, 2013) leaves much to desire in them, even though the planes and the combat are depicted accurately, as they were designed in consultation with historical advisers, the images lack realism, looking like they were from a video game. This is so because they try to recreate major battles, with hundreds of planes and spectacular shots, which requires many hours of production with renders to do it. This needs a larger budget than the one they had, which is apparent in the end result.

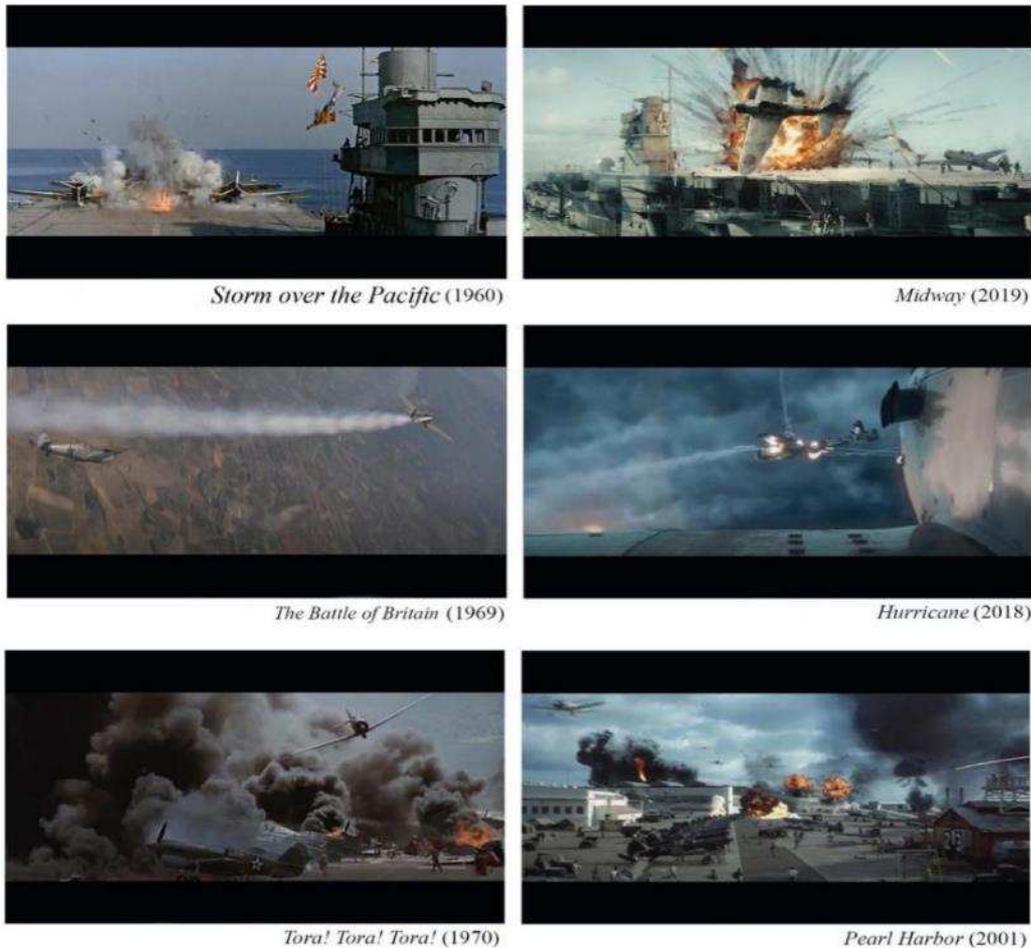
In other works, like *Flyboys* (2006), *Der rote Baron/The Red Baron* (Nikolai Muellerschoen, 2008) or *Red Tails* (Anthony Hemingway, 2012), a much better result can be seen, as these films had bigger budgets (Figure 19).

Even with all that, *Flyboys* (2006) contains serious historical errors. In it, German Fokker Dr.1s face French Nieuport 17s, something that never happened as the French plane had been withdrawn from service long before the famous German triplane entered combat. This shows that despite the technical tools and budget available to filmmakers, the historical accuracy of a production ultimately depends on previous documentation and the filmmakers' interest in history.

Computer-generated imagery makes it possible to recreate spectacular shots that would be impossible to film with real aircraft and conventional special effects. Models and explosions offer great realism, but always at a certain distance from the camera, while CGI enables long takes among hundreds of planes, passing through explosions and dropping at full speed alongside a dive bomber. If we compare the images filmed for *Storm over the Pacific*

(*Hawai Middowei daikaikūsen: Taiheiyō no arashi*, Shūe Matsubayashi, Hugo Grimaldi, 1960) and those from the film *Midway* (Roland Emmerich, 2019), or those of *The Battle of Britain* (1969) with *Hurricane* (David Blair, 2018), as well as those from *Tora! Tora! Tora!* (1970) and those of *Pearl Harbor* (2001), we can see that, beyond the spectacular nature of the shots and explosions, the historical precision of the depiction and the accuracy when recounting the events, the classic films have no reason to envy the more modern representations (Image 5).

**Image 5:** Still comparisons between aerial combat sequences in classic films (left) and modern films (right).

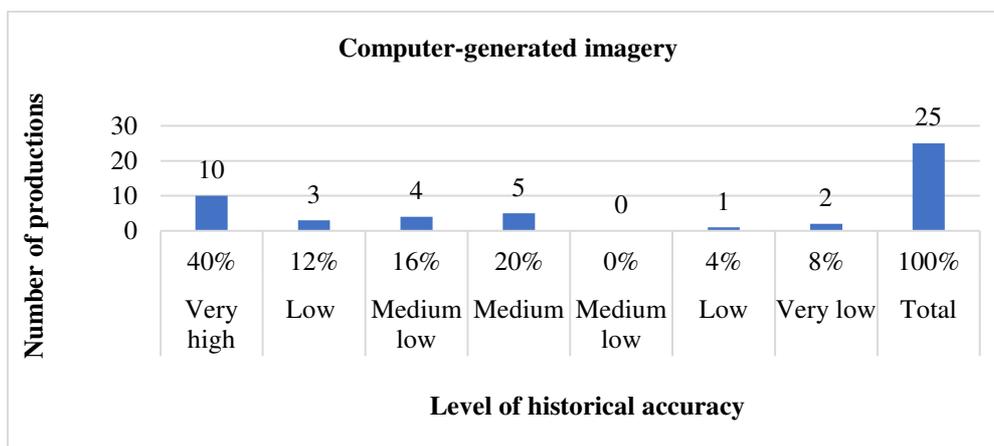


Illustrating these arguments, the film *Dunkirk* (2017) underlines how eschewing the help of CGI can help represent aerial combat with greater realism than works such as *Pearl Harbor* (2001), *Red Tails* (2012) or *Midway* (2019), which, despite making good use of CGI in the representation of aircraft, combat tactics and staging, make excessive use of explosions and fast-paced action in pursuit of spectacle.

Nolan chose not to use CGI, favouring traditional techniques to try to be as faithful as possible to reality. Accordingly, he used real planes –three Supermarine Spitfires and two of the aforementioned Hispano Aviación HA-1112 Buchóns as Messerschmitt Bf-109s– and some large-scale radio-controlled models, as well as a Yak-52 two-seater modified to look like a Spitfire, with mounts for the camera outside the cockpit to film close-ups of the pilots, thus imitating the pioneers of aerial photography in *Wings* (1927). The result is combat with a slower pace of action, but which maintains tension all through the sequence.

None of this detracts from the advances provided by computers. Of the 25 films studied that use CGI, 10 have a very high level of historical accuracy and just 3 low or very low. This underlines the fact that this technique largely favours historical accuracy in the productions in which it is used.

**Figure 4:** Relationship between the number of productions in the study that use CGI and their level of historical accuracy.



Source: Own elaboration.

## 9. Conclusions

The results of this work show that aerial combat films have used different cinematographic techniques throughout their almost a century of history. All of them, independently of the care taken by producers and directors when applying them, have greatly contributed to the evolution of this subgenre and to its growth as a source of historical dissemination, with the single exception of the use of footage from other films and archive images, which does not contribute substantially to this evolution, owing, above all, to a lack of care in their use. The money saved for the production by using external footage has a serious impact on the artistic quality of the work.

Through the examples analysed, we can see how technical means largely shape the level of historical accuracy and realism of this type of production, always taking into account the fact that there is usually a direct link between the budget and the creators' interest in history on the one hand and the end result on the other, regardless of the era and the techniques used.

In the case of the budget, it becomes a determining factor when deciding what techniques are used in the production, since it is always cheaper to use footage from other films or even CGI instead of renting real planes or making replicas. In addition, having a good budget helps increase the historical rigor in interesting details, albeit usually minor in terms of their impact on the transmission of historical knowledge to the viewer. These include higher quality costume design, vehicle equipment, settings and props.

There are script and concept errors derived from a lack of documentation in all eras, but the level of detail and precision in the aircraft and staging largely depend on the technology available at a given moment. After the Second World War, and to a lesser extent the First World War, the surplus of aircraft made it much easier to use the correct planes in productions from the 1960s and 70s. For its part, CGI makes it possible to recreate and design scenes and shots that the pioneers from the 1930s could barely dream of, even though they had specialists who could crash-land a plane with the greatest realism.

Each era has its advantages and limitations, each production has its budget and its advisers, but through the study it becomes clear that the use of some cinematographic techniques or others can contribute greatly to improve or decrease film quality as a source of historical dissemination.

Technology helps and provides endless possibilities for directors and producers, and yet, as Christopher Nolan shows in *Dunkirk* (2017) and Elmo Williams in *Tora! Tora! Tora!* (1970), the end result ultimately depends on the commitment to history and the selection of the most appropriate technical tools to convey it.

This study reveals the ability of film technique to influence the rigor of historical cinema in audiovisual productions. Looking to the future, it would be interesting to continue rigorously monitoring the work carried out with the different techniques in future productions of this type and its evolution. Understanding the ability to bring rigor to film productions that new techniques or innovations in working with existing ones can have, can lead producers interested in telling history with rigor to improve the quality of their work as a source of historical dissemination without subtracting artistic quality to the works and to make better use of the budgets dedicated to this regard.

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## Annex 1. Analysed films

- 12 O'Clock high* (Quinn Martin, USA, 1964-1967).  
*633 Squadron* (Walter E. Grauman, USA and UK, 1964).  
*A Gathering of Eagles* (Delbert Mann, USA, 1963).  
*A Guy Named Joe* (Victor Fleming, USA, 1943).  
*A Yank in the RAF* (Henry King, USA, 1941).  
*Aa kaigun / Getaway to Glory* (Mitsuo Murayama, Japan, 1970).  
*Above and Beyond* (Melvin Frank and Norman Panama, USA, 1952).  
*Ace of Aces* (J. Walter Ruben, USA, 1933).  
*Aces High* (Jack Gold, USA, 1976).  
*Aerial Gunner* (William H. Pine, USA, 1943).  
*Air Cadet* (Joseph Pevney, USA, 1951).  
*Air Force* (Howard Hawks, USA, 1943).  
*Al-too-bi: Riteon too beiseu / Soar into the sun* (Dong-won Kim, South Korea, 2012).  
*Anadolu Kartallari* (Ömer Vargi, Turkey, 2011).  
*Angel of the Skies / Wings of Honour* (Christopher-Lee dos Santos, South Africa 2013).  
*Angels One Five* (George More O'Ferrall, UK, 1952).  
*Apocalypse Now* (Francis Ford Coppola, USA, 1979).  
*Appointment in London* (Philip Leacock, UK, 1953).  
*Arise my Love* (Mitchell Leisen, USA, 1940).  
*Baa Baa Black Sheep Squadron* (Stephen J. Cannell, USA, 1976-1978).  
*BAT 21* (Peter Markle, USA, 1988).  
*Battle Hymn* (Douglas Sirk, USA, 1957).  
*Battle of the Coral Sea* (Paul Wendkos, USA, 1959).  
*Black Thunder* (Rick Jacobson, USA, 1998).  
*Bombardier* (Richard Wallace, USA, 1943).  
*Bomber Harris* (Don Shaw, UK, 1989).  
*Bombers B-52* (Gordon Douglas, USA, 1957).  
*British Intelligence* (Terry O. Morse, USA, 1940).  
*By Dawn's Early Light* (Jack Sholder, USA, 1990).  
*Captain Eddie* (Lloyd Bacon, USA, 1945).  
*Captains of the Clouds* (Michael Curtiz, Canada and USA, 1942).  
*Castles in the Sky* (Gillies MacKinnon, UK, 2014).  
*Chain Lightning* (Stuart Heisler, USA, 1950).  
*China Doll* (Frank Borzague, USA, 1958).  
*Command Decision* (Sam Wood, USA, 1948).  
*Crimson Romance* (David Howard, USA, 1934).  
*D III 88* (Herbert Maisch, Germany, 1939).  
*Da Hong zha / Air Strike* (Xiao Feng, China, 2018).  
*Darling Lili* (Blake Edwards, USA, 1970).  
*Dauntless: The Battle of Midway* (Michael Phillips, USA, 2019).  
*De Dunquerque a la victoria / Contro 4 bandiere / De l'enfer à la victoire* (Umberto Lenzi, Spain, France and Italy 1979).  
*Der Rote Baron / The Red Baron* (Nikolai Muellerschoen, Germany, 2008).  
*Der Stern von Africa / La estrella de África* (Alfred Weidenmann, Germany and Spain, 1957).  
*Desperate Journey* (Raoul Walsh, USA, 1942).  
*Devil Dogs of the Air* (Lloyd Bacon, USA, 1935).  
*Dive Bomber* (Michael Curtiz, USA, 1941).  
*Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* (Stanley Kubrick, USA, 1964).

- Dragonfly Squadron* (Lesley Selander, USA, 1954).  
*Dresden* (Roland Suso Richter, Germany, 2006).  
*Dunkirk* (Christopher Nolan, UK, USA, France and Netherlands, 2017).  
*Dywizjon 303 / 303 Squadron* (Denis Delic, Poland, 2018).  
*Eagle Squadron* (Arthur Lubin, USA, 1942).  
*Eien no Zero / The Eternal Zero* (Takashi Yamazaki, Japan, 2013).  
*Empire of the Sun* (Steven Spielberg, USA, 1987).  
*Enola Gay* (David Lowell Rich, USA, 1980).  
*Escuadrilla* (Antonio Román, Spain, 1941).  
*Escuadrón 201* (James Salvador, Mexico, 1945).  
*Fail Safe* (Stephen Frears and Martin Pasetta, USA, 2000).  
*Fail-Safe* (Sidney Lumet, USA, 1964).  
*Feng Huo Fang Fei / In Harm's Way* (Bille August, China, 2017).  
*Fighter Squadron* (Raoul Walsh, USA, 1948).  
*Fire Birds* (David Green, USA, 1990).  
*Firefox* (Clint Eastwood, USA, 1982).  
*First Light* (Matthew Whiteman, UK, 2010).  
*Flat Top* (Lesley Selander, USA, 1952).  
*Flight Command* (Frank Borzage, USA, 1940).  
*Flight of the Intruder* (John Milius, USA, 1991).  
*Flyboys* (Tony Bill, USA and France, 2006).  
*Flying Leathernecks* (Nicholas Ray, USA, 1951).  
*Flying Tigers* (David Miller, USA, 1942).  
*For Those in Peril* (Charles Crichton, UK, 1944).  
*Fortress* (Michael R. Phillips, USA, 2012).  
*From Here to Eternity* (Fred Zinnemann, USA, 1953).  
*Gernika* (Koldo Serra, France, 2016).  
*Hanover Street* (Peter Hyams, USA, 1979).  
*Hawai Middoway daikaikūsen: Tahiheiyō no arashi / De Pearl Harbor a Midway* (Shuei Matsubayashi, Japan, 1960).  
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*Hurricane* (David Blair, UK and Poland, 2018).  
*I Wanted Wings* (Mitchell Leisen, USA, 1941).  
*Interceptor* (Michael Cohn, USA, 1992).  
*Into the Storm* (Tardes O'Sullivan, UK, 2009).  
*Iron Eagle* (Sidney J. Furie, USA, 1985).  
*Ispanets / El español* (Aleksandr Tsatasuev, Russia, 2012).  
*Jet Attack* (Edward L. Cahn, USA, 1958).  
*Jet Pilot* (Josef von Sternberg, USA, 1957).  
*Jian shi chu ji / Sky Fighters* (Haiqiang Ning, China, 2001).  
*Journey Together* (John Boulting, UK, 1945).  
*Kato Hayabusa Sento-tai / Colonel Kato Falcon Squadron* (Kajirō Yamamoto, Japan, 1944).  
*Kaze tachinu / Th Wind Rises* (Hayao Miyazaki, Japan, 2013).  
*L'instinct de l'angel* (Richard Dembo, France, 1993).  
*L'Equipage* (Anatole Livat, France, 1935).  
*Ladies Courageous* (John Rawlins, USA, 1944).  
*Lafayette Escadrille* (William A. Wellman, USA, 1957).  
*Lancaster Skies* (Callum Burn, UK, 2019).  
*Les Chevaliers du Ciel* (Gérard Pirès, France, 2005).

- Lilac Time* (George Fitzmaurice and Frank Lloyd, USA, 1928).  
*Malta Story* (Brian Desmond Hurst, UK, 1953).  
*Memphis Belle* (Michael Caton-Jones, UK, 1990).  
*Men of the Fighting Lady* (Andrew Marton, USA, 1954).  
*Men with wings* (William A. Wellman, USA, 1938).  
*Midway* (Jack Smight, USA, 1976).  
*Midway* (Roland Emmerich, USA, 2019).  
*Mosquito Squadron* (Boris Sagal, UK, 1969).  
*No le busques tres pies...* (Pedro Lazaga, Spain, 1968).  
*One minute to Zero* (Tay Garnett, USA, 1952).  
*One of our aircraft is missing* (Michael Powell and Emeric Pressburger, UK, 1942).  
*Partizanska eskadrila / The Partizan's Squadron* (Hajrudin Krvavac, Yugoslavia, 1979).  
*Pearl Harbor* (Michael Bay, USA, 2001).  
*Piece of Cake* (Ian Toynton, UK, 1988).  
*Pilot #5* (George Sidney, USA, 1943).  
*Pour de Mérité* (Karl Ritter, Germany, 1938).  
*Reach for the Sky* (Lewis Gilbert, UK, 1956).  
*Red Tails* (Anthony Hemingway, USA, 2012).  
*Rengô kantai shirei chōkan: Yamamoto Isoroku / Isoroku Yamamoto, the Commander-in-Chief of the Combined Fleet* (Izuru Narushima, Japan, 2011).  
*Rengô kantai shirei chōkan: Yamamoto Isoroku / Admiral Yamamoto* (Seiji Maruyama, Japan, 1968).  
*Rod La Rocque, Sue Carol / Captain Swagger* (Edward H. Griffith, France, 1928).  
*Sabre Jet* (Louis King, USA, 1953).  
*Seven were saved* (William H. Pine, USA, 1947).  
*Ships with Wings* (Sergei Nolbandov, UK, 1941).  
*Sky Devils* (A. Edward Sutherland, USA, 1932).  
*Strategic Air Command* (Anthony Mann, USA, 1955).  
*Stukas* (Karl Ritter, Germany, 1941).  
*Surface to Air* (Rodney McDonald, USA, 1998).  
*Suzy* (George Fitzmaurice, USA, 1936).  
*Taiheiyō no tsubasa / Wings Over the Pacific* (Shuei Matsubayashi, Japan, 1963).  
*Target for Tonight* (Harry Watt, UK, 1941).  
*Task Force* (Delmer Davis, USA, 1949).  
*Test Pilot* (Victor Fleming, USA, 1938).  
*The Airship Destroyer* (Walter R. Booth, UK, 1909).  
*The Amazing Howard Hughes* (William A. Graham, USA, 1976).  
*The Aviator* (Martin Scorsese, USA, 2004).  
*The Battle of Britain* (Guy Hamilton, UK, 1969).  
*The Best Years of Our Lives* (William Wyler, USA, 1946).  
*The Blue Max* (John Guillermin, USA and UK, 1966).  
*The bridges a Toko-Ri* (Mark Robson, USA, 1954).  
*The Court Martial of Billy Mitchell* (Otto Preminger, USA, 1955).  
*The Chronicles of Young Indiana Jones: The Attack of the Hawkmen* (Ben Burt, USA, 1995).  
*The Dam Busters* (Michael Anderson, UK, 1955).  
*The Dawn Patrol / The Flight Commander* (Howard Hawks, USA, 1930).  
*The Dawn Patrol* (Edmund Goulding, USA, 1938).  
*The Eagle and the Hawk* (Stuart Walker, USA, 1933).  
*The First of the Few* (Leslie Howard, UK, 1942).  
*The Hunters* (Dick Powell, USA, 1958).

- The Lion has Wings* (Michael Powell, Brian Desmond Hurst, Adrian Brunel and Alexander Korda, UK, 1939).
- The McConnell Story* (Shuei Matsubayashi, USA, 1955).
- The Purple Heart* (Lewis Milestone, USA, 1944).
- The Right Stuff* (Philip Kaufman, USA, 1983).
- The Sea Shall Not Have Them* (Lewis Gilbert, UK, 1954).
- The Sound Barrier* (David Lean, UK, 1952).
- The Story of Vernon and Irene Castle* (H. C. Potter, USA, 1939).
- The Thousand Plane Raid* (Boris Sagal, USA, 1969).
- The Tuskegee Airmen* (Robert Markowitz, USA, 1995).
- The War Lover* (Philip Leacock, UK, 1962).
- The Way to the Stars / Johnny in the clouds* (Anthony Asquith, UK, 1945)
- The Wings of Eagles* (John Ford, USA, 1957).
- The Woman I love* (Anatole Litvak, USA, 1937).
- Thirty Seconds Over Tokyo* (Mervyn LeRoy, USA, 1944).
- Thunderbirds: Soldiers of the Air* (William A. Wellman, USA, 1942).
- Thundering Jets* (Helmut Dantine, USA, 1958).
- Tmavomodrý svet / A Dark Blue World* (Jan Sverák, Germany, Denmark, Italy, UK, Czech Republic, 2001).
- Today We live* (Howard Hawks and Richard Rosson, USA, 1933).
- Top Gun* (Tony Scott, USA, 1986).
- Tora! Tora! Tora!* (Richard Fleisher, Toshido Masuda and Kinji Fukasaku, USA, 1970).
- Torpedonosty / Torpedo bombers* (Sayón Aranovich, Russia, 1983).
- Toward the Unknown* (Mervyn LeRoy, USA, 1957).
- Twelve O'clock High* (Henry King, USA, 1949).
- Unbroken* (Angelina Jolie, USA, 2014).
- Von Richthofen and Brown* (Roger Corman, USA, 1971)
- Wake Island* (John Farrow, USA, 1942).
- We were soldiers* (Randall Wallace, USA, 2002).
- Wing and a Prayer. The Story of Carrier X* (Henry Hathaway, USA, 1944).
- Wings* (Barry Thomas, UK, 1977-1978).
- Wings* (William A. Wellman, USA, 1927).
- Young Eagles* (William A. Wellman, USA, 1930).
- Za Kokupitto / The cockpit* (Yoshiaki Kawajiri, Takashi Imanishi and Ryôsuke Takahashi, Japan, 1993)
- Zeppelin* (Etienne Perier, UK, 1971).
- Zerkalnie voyni: Otrazhenie pervoye / Mirror Wars: Reflection One* (Vasili Chiginsky, Russia 2005).
- Zerosen Moyu / Zero* (Toshio Masuda, Japan, 1984).