ACADEMY OF PERFORMING ARTS IN PRAGUE

FILM FACULTY

2 years FAMU Master's Program

Cinematography

MASTER'S THESIS

Problematics of the Long take in film : From film to digital age.

Kan-anek Rachatasakul

Thesis advisor: Marek Jicha

Examiner: Vladimir Smutny

Date of thesis defense: September 16, 2016

Academic title granted: Masters Degree

Prague, 2016

Declaration

I declare that I have prepared my Master's Thesis, Dissertation independently on the following topic:

Under the expert guidance of my thesis advisor and with the use of the cited literature and sources.

Prague, date: ....

Signature of the candidate

Warning

The use and public application of the findings of this thesis or any other treatment thereof are permissible only on the basis of a licensing contract, i.e. the consent of the author and of the Academy of Performing Arts in Prague.

User's Log

By signing below, the user attests that he/she has used this thesis solely for study purposes, and he/she declares that he/she will always cite the thesis appropriately among the sources used.

Name	Institution	Date	Signature

Abstract

The purpose of the thesis is to expose and list the majority of the issues for utilizing narrative technique, which is "Long take or continuous take." Long take has been used for a long time, and a number of directors and cinematographers are continuing to use it to tell a story in an stylized way. In digital revolution age, when innovation is rapidly developing, the majority of film procedures have been changed from analog to digital.

Methods for using long take are also changing. All of the problematic part in analog age, which appeared to be difficult to make; it turns out to be very effortless in the digital age. The point is to classify the majority of the issues that has been resolved by the changing of technology (from analog to digital); but on the other hands, some problems couldn't be solved by technology. However, changing to digital age does not has only advantages but many mistakes are appeared in digital age.

Concentrating on a history of long take additionally demonstrates the way of its development, and the explanation behind the use of the technical as well as how the Long take can influence and affect the audience.

Abstrakt

Cílem této práce je odhalit a popsat většinu problémů spojených s užíváním narativních technologií, jako je "Long take/dlouhý záběr nebo continous take/kontinuální záběr." Dlouhý záběr je využíván již mnoho let a velké množství režisérů a kameramanů jej stále využívá k stylizovanému vyprávění příběhů. V době digitální revoluce, kdy se inovativní technologie rychle vyvíjejí, většina filmových postupů přešla z analogu na digitál.

Rovněž se mění i metody užívání dlouhého záběru. Všechny problematické aspekty analogové éry, které se zdály být složité na výrobu, se staly velmi lehce proveditelné v digitální době. Smyslem je určit většinu těch problémů, které byly s příchodem digitálních technologií vyřešeny, ale také popsat ty, jenž odstraněny nebyly. Nicméně, přechod k digitálním technologiím nemá pouze výhody, ale také mnoho chyb.

Při pohledu na historii užívání dlouhého záběru současně získáváme údaje o jeho vývoji, vysvětlení jeho technického využití a také informace o jeho vlivu na publikum.

Table of contents

Introduction

Nowadays in the age of globalization, technology and communication are developing very fast and become simpler in many respects. The new developments have changed and improved the filmmaking industry in many different ways. For example, camera and lighting equipment have become cheaper and more convenient, which reduces the cost of production and also supports the creativity of the filmmaker.

From the age of film cameras to digital cameras, the way of film language and story telling has changed. Many techniques become useful and possible for every filmmaker. Long take or long sequence becomes possible for every class of filmmakers. It is used in many kinds of work such as feature film, music video and television programs. The long take can separate into two types. The first type consists of a static camera and the other one uses a mobile camera. In this thesis we will focus on the mobile long take.

Figure 1.0 *The stunning mobile long take shot in first shot of Gravity (2013). It lengths is 17 minutes.*[1]

This thesis will examine the technique of mobile long take, taking care to define terms and outline procedures involved. The first chapter will briefly examine the history of the long take technique, looking to how the mobile style developed from the static camera style over the course of film history and especially in the shift from the film age to digital age. Chapter two will discuss relevant problems occurring when shooting with long take technique. As Alejandro Gonzales Inarritu notes, when shooting long takes, the film makers

[1] https://endoftheworldandgrass.wordpress.com/2015/05/02/gravity-2013-no-more-just-driving-lets-go-home/

need to spend more time for planning and shooting. During a Q&A following the premiere of his film *The Revenant*, he says

> *"All the camera work, all the blocking, all the lighting was pre-designed months in advance."* [2]

This thesis will go into detail about what is involved in the planning and execution of the long take.

It is hoped that through this examination, the reader will be more informed about guidelines used in decision-making on long take technique, and will be better prepared to use new technologiesrelated to long take achievement in the digital age.

Figure 1.1 *Birdman (2014) got the prize for Best Picture at the 87th Oscar award. Long takes are used throughout the movie.*[3]

What is Long Take?

In the 1890s, when motion picture cameras were invented and in that moment the history of film was began but not continuous shot because of limited of technology, film could capture under a minute long. After several years, by using electric motor, movie camera are developed and allow filmmakers to capture more than a minute long. Continuous shot was started but nobody give a definition of it in that period.

To give a definition of long take is quite difficult, we could say that long takes are continuous shots that last longer than the typical shot. Brian

[2] http://thecreatorsproject.vice.com/blog/a-look-back-at-birdman-cinematographer-emmanuel-lubezkis-iconic-long-shots

[3] http://www.telegraph.co.uk/film/birdman/gallery/

Henderson wrote in his essay "The Long Take (1976)", describes the meaning as

> *"A single piece of unedited film, which may or may not constitute an entire sequence."* [4]

The length of shot become the main factor to sepearate long take and non long take. By the way, nobody starts to set the standard number of length for measuring and sepearting

According to the research about the long take from Donato Totaro, he founds that 25-40 second is a general length of long take shot.[5] However, long take should not define by using statistical analysis but the best way to give a definition of long take should relate to its aesthetic effect, and how it is useds within the scene.

In 1997s, Mark Le Fanu give his opinion about long take from his perspective in his essay.

> *In general, I think it is important in the definition of the long take to go for the spirit of the thing, not the letter ... it is not so much the actual length of the take that is crucial (as though it were measured by a stop- watch) but the fact that ... [it] is geared towards contemplative engagement. FN (Le Fanu 1997)*[6]

The term of word, "long shot" and "long cut" also use to mean "long take" in some situation. But it makes for some confusion because the term "long shot" also means the size of shots which a camera could capture in a large area, such as the actors and their surroundings.

---

[4] Brian Henderson, The Long Take, 1976

[5] Donato Totaro, Time and the long take in The Magnificent Ambersons, Ugetsu and Stalker. PhD thesis, University of Warwick, 2001

[6] Mark Le Fanu, Metaphysics of the "long take": some post-Bazinian reflections, 1997

Figure 1.2 *Long shot or LS* [7]

The term of "long cut" could also means the longest version of a motion picture including the fewest cuts. To make this thesis more clear, no "long cut" or "long shot" will be used to replace the "long take" meaning.

On the practical side, a long take is a continuous shot without cuts and is always made using a single camera. One type of Long take technique is called the Mobile long take, (more detail on that is made in Chapter 2). It always involves a combination between changing the scenery, movement of actors and camera moving. The camera is often on a dolly, crane or stabilizers.

Long takes are very difficult to make because they requied extensive technical coordination of the actors, camera operator and lighting department. Mistakes from any department in crews is not acceptable because it means a retake from the beginning. However, long take is one of the most beautifuly tools of cinema.

[7] https://www.emaze.com/@AOTOITQZ/Camera-angles-shots-(2).pptx

Chapter 1

Background

This chapter will relate to the history of long take and also types of long takes. By studying the background of the longtake, the reader will know more about the development of the long take, not just only definitions The reader will could also distinguish between static long take and mobile long take. In Chapter 2, the use of the long take term refers to mobile long take so it really important to clearly understand the mobile long take.

History always show problems and mistakes in the past, from that we could learn how they solved it. As we know, problems always happen while shooting long take, experience is one of the best helpful tool.

For studying all long take from films in history are impossible because until now, uncounted long take is produce. Only noticeable and important films for long take history will be treated in this chapter.

1.1) History of Long Take

A literature survey suggests that Alfred Hitchcock was the first person to utilise long take techniques, however, this is only half of the truth. The history of the long take began when the camera was held still without any movement.

From European art filmmakers such as *Sunrise: A song of Two Humans (1927)* by Friedrich Wilhelm Murnau. Alfred Hitchcock took inspirations and shot *Rope (1948).* He is the first filmmaker who introduced long takes by using camera movement to cinema. He tries to shoot a long take but was limited by the film camera from that period. It was impossible to make it. Alfred Hitchcock ended up with a combination of multiple shots together and tired to hide the editing to make it look like one long take shot.

After *Rope*, many films followed Alfred Hitchcock's idea and started to increase the length of each shot.

In 1958, long take become well known in film industry. Orson Welles continue the history of long take by *Touch of Evil*. Because of limited of technology and also how complicated of its. Rarely film could make it.

However, after *Touch of Evil* many noticeable long take still created such as *Week End (1967)* and *Atonement (2007).*

Figure 1.3 *Left: Touch of evil (1958)[8], Right: Rope (1948)[9]*

As filmmaking progressed, the time of the long takes in Hollywood was increased. Barry Salt's examination shows the average shot length of Hollywood films during the 1940s and 1950s: 1934-9 (9 seconds), 1940-5 (8.97 seconds), 1946-51 (10.47 seconds), 1952-7 (10.13 seconds).[10]

According to his published dissertation, Camera Movement in Narrative Cinema (2007), Jakob Isak Nielsen, found that from 1958 to 1963, the average shot length decreased to 8.8 seconds.[11]

In that period, most of Hollywood's film became short takes and heavy editing to create a fast rhythm. However, many directors who were attracted to telling story by using long take were still improving the way of using longtake in terms of concept and combining it with new innovations. Using long take

---

[8] http://t3.gstatic.com/images?q=tbn:ANd9GcSH3yLSn_eWdfBhPHw3yfK5trT-mGSLG_E8zaQIcaVMNXi8-jkc

[9] http://www.gradesaver.com/rope

[10] Jakob Isak Nielsen, Camera Movement in Narrative Cinema, 2007

[11] Jakob Isak Nielsen, Camera Movement in Narrative Cinema, 2007

technically became a trademark of many directors such as Paul Thomas Anderson, for example in his well-known films *Boogie Night (1997)* and *Magnolia (1999)*.

In 2002, *Russian Ark* by Aleksandr Sokurov, is the first entire one take film in history. Using a Sony HDW-F900 digital camera allows to continuously record an uncompressed high definition quality footage up to 100 minutes but the film was completed at 90 minutes.

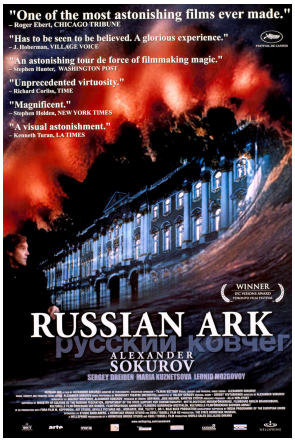

Figure 1.4 *Russian Ark (2002)*[12]

In 2007, one of the notable long take in history, is from *Atonement* by Joe Wright. A 5.30 minutes long take shot used thousand extras, numerous horses on the beach including vehicles, even ships digitally created in the scene. However, in the beginning, this scene does not plan to shoot using long take technical.

The scene was set to be shot in one day because of the amount of extras, so Joe Wright and Seamus McGarvey, decided to make it in a single long shot instead of having many separate setups.

[12] http://www.rocklandstrand.com/event/russian-ark

Figure 1.5 *Atonement (2007)* [13]

At present, the new age of filmmakers is using, many technology that is developing very fast and continuously. The technology supports the shooting of long takes, especially equipment such as a steadicam which create stabilizer effect to image, Technocrane, which is breaking the limits of old fashion cranes , and the J.L. Fisher dolly, which make setting up dolly become more faster and possible to boom up a camera without using a jib.

In *The Revenant (2015)* by Alejandro Gonzalez Inarritu, many lengthy shots appear in this film, including a courageous steadicam, handheld and crane shots.

Victoria (2015) by Sebastian Schipper, shows how far of long take technical is developed. 57 years after the *Touch of Evil*, *Victoria* was shot easily - the entire film, 138 minutes, in one long take without editing.

Longtake history show how filmmakers are attracted to the long take technically. The refinement and choreography of long take shot, have become absolutely beautiful and represent a high level of cinema art.

1.2) Types of long take (Static long take and Mobile long take)

Referring to the definition of long take in the beginning of thesis, the long take does not relate to camera movement but it always focuses on the length of the shot. However, in this thesis, we will separate long take into two types. Static long take and Mobile long take.

[13] https://vimeo.com/91846884

The Static long take is a long take technically shot by a camera that stands still. Characters move in and out of the shot. The setting become focused and sometimes it reduces the prominence of the characters. It is absolutely an opposite concept from the Mobile long take where the camera is following a character's movement. Static long takes give a stagey feeling. The visual will look like a stage and both sides are the entrance and exit ways.

Many expert cinematographers in film history are masters at making a static long take shot by creating a visually interesting and changing composition. As we know, the size of a character in a composition is one of the narrative tools in cinema language. It gives a meaning and different information to audience. For example, Long-shot and Close-up, give an absolutely different meaing in storytelling. A long-shot leads the audience to focus on location more than characters. It is mostly used in the opening establishing shot of the movie. On the other hand, close-ups allow viewers to see more face or eyes of characters to absorb their emotion.

Citizen Kane (1941) by Orson Welles, is a great example of changing the size of a character in a static long take. The opening shot is a close-up of a character who is reading the paper and then becomes a two-shot with a main character who stood far away in a small size. He walks close to the camera and become bigger and it called medium-shot interms of cinema language. However, this scene was shot by a static camera with panning and tilting only.

Figure 1.6 *Citizen Kane (1941)* [14]

The second type of long take is the Mobile long take. It is a combination between a long take and a tracking shot. Referring to the wikipedia website, a

[14] http://www.davidbordwell.net/blog/2016/05/06/welles-at-101-kane-at-75-or-thereabouts/

tracking shot means any shot where a camera is moving by using special equipments such as a camera dolly, handheld or steadicam.[15]

Without moving something inside or outside of the frame, the audience will get bored easily. Constant movements of mobile long take become beneficial for engaging the audience's attention.

One very fine example of a mobile long take is in *The Cranes are Flying (1957).* Here we have a great case study to show how a mobile long take looks.

Figure 1.7 *The Cranes are Flying (1957)*[16]

This shot begins with a medium close-up of a character in a bus by using handheld. Until a bus stops, a camera follows her walking through many crowd. In the end of shot, a camera operator goes up on a crane and the result of shot become bird eye view angle.

Comparing between Static and Mobile long take, we really could notice that the Mobile long take is more complicated than the Static long take because so many variables are involved. The main purpose of this thesis is to focus on those variables within the Mobile long take. Chapter 2 now turns to the problematics involved in shooting the Mobile long take.

1.3) Goal and constuction of long take.

This thesis studied long takes by focusing deeply on the technical problems. However, we must not forget about the dramaturgical aspect resulting from using long take techniques which will be discussed and summarised using

[15] https://en.wikipedia.org/wiki/Tracking_shot

[16] https://www.youtube.com/watch?v=3U9ceWpqyMk

clear and concise language.

The concept of a long take is to present or tell a story as it is perceived by the individual. The human brain cannot perceive the mixing of multiple shots similar to an editing function. Thus long takes create and resemble natural experiences for the audience. Using this effect, the viewers feel comfortable and become part of the storyline. This illusion can also be created by the editing function, but this needs to be done very well.

Andrej Tarkovskij, a master of the long scene take, noted that there were two kinds of filmmakers; those who created a world and those who reflected the world which they saw around them. Using the long take technique is one of the reflection tool.[17]

A three minutes long take in the 1990 crime drama *Goodfellas* directed by Martin Scorsese which used technical effects to create an extremely realistic scene is often discussed by filmmakers.

Figure 1.8 *Goodfellas (1990)* [18]

The scene starts with a close-up shot of Henry Hill's hand giving his car keys to a valet. The camera follows Henry and his girlfriend across the street and into the Copacabana night club. They walk in through a back door, down various dimly lit corridors, through a busy kitchen and the scene ends with them being seated at a table.

Many filmmakers say that cinema is all about visual language, however, this is not always completely true. Dialogue is also an important tool for the scriptwriter and director to tell a story in a short and direct way.

[17] http://a-bittersweet-life.tumblr.com/post/80798317526/21-inspiring-quotes-from-andrei-tarkovsky-on-art

[18] http://www.criticalcommons.org/Members/ccManager/clips/long-take-tracking-shot-for-narrative-exposition/view

In this scene, natural dialogue is used throughout in a realistic way. However, this does not mean that using dialogue with an editing function is unnatural. A careful examination reveals that use of exposure time enhances the reality. Directors and scriptwriters add dialogue which is not relevant to developing the story but makes the scene more realistic.

For example, at the beginning of the scene when Henry walks across the street he talks casually to his girlfriend. A lot of the dialogue between them does not develop the main theme of the story but is important to portray their relationship to the audience in a natural environment. If some of the dialogue is cut out, then this does not change the overall story line.

When Henry enters the back door and walks through the dimly lit corridors he talks to staffs at the Copacabana night club. Dialogue is used here to show how often Henry comes to this night club and his relationship with workforce.

Howover, The scene could uses the editing function to relate this information as same as it is done by using long take technique. Wide angle shots and close-ups of Henry talking with one or two staff members would be sufficient. However, the different is the way how long take created more realistic effect to audience.

Figure 1.9 *Kitchen scene in Goodfellas (1990)* [19]

Long scenes show the entire filming environment and illuminate the vitality of the set. Henry takes 34 seconds to walk through the kitchen but in this short time many emotions and the atmosphere inside the kitchen is revealed. All the staff are happy to see Henry; they laugh and joke with him. The kitchen is very hectic and busy and the audience soaks up more information compared to the editing function because the long take allows their eyes to pick and choose

[19] http://www.criticalcommons.org/Members/ccManager/clips/long-take-tracking-shot-for-narrative-exposition/view

the important aspects of the story and absorb every detail on the screen instead of being guided by an editing function.

One interesting benefit of the long take is real time capture. For example, In *Touch of Evil (1958)* directed by Orson Welles, the long opening scene begins with a close-up of a man planting a bomb in a car boot. The audience immediately predicts that the bomb will go off, but the interesting question is, when will this happen? Orson Welles uses this characteristic of the long scene exposure in real time to make the audience wait for the bomb to explode. He also increases the tension by the dramatic use of a wide-angle lens on a crane to capture the scene from a bird's eye view of the street. By using this wide angle technique the audience automatically focuses more on the set than on the emotion of the characters and infers that the bomb could explode at any time.

Figure 2.0 *Touch of evil (1958)* [20]

After the next shot which shows the bomb exploding, the second main purpose of the long take is noticeable as increasing the drama of the whole situation. Using real-time strengthens the relationship between the camera and the actors. The audience perceives themselves in the street with the car and the characters. A camera follows Mike and Susan as they run to the car bombing area with the camera pointing at them, not at the wrecked car. This allows the audience to image the burning vehicle outside the frame by absorbing the acting of the characters.

[20] https://www.youtube.com/watch?v=ODu18vd_PI0

Figure 2.1 *Touch of evil (1958)* [21]

The construction of long scene shots is similar to editing. With mobile cameras, frequent movement can be broken into discrete units such as tilting, panning, tracking and craning. This creates a series of new compositions but does not break the continuous recording of the scene in space and time.

[21] https://www.youtube.com/watch?v=ODu18vd_PI0

Chapter 2

Problematic of Longtake

This chapter will reveal all of the difficulties that might be happened in shooting long take. We know that the long take is perhaps one of the most difficult techniques for the cinematographer and director to achieve. Much skill is needed to accomplish it. It takes more work and absolutely different system of pre-production, production and post-production compare to filming without longtake. It requires double or triple time to rehearse actors and all blocking needs to be precise.

Anne Billson, a British novel author and blog writer of theguardian.com, share her experience when she made one of her shortfilms which was filmed in long take.

> *" When I made my first short film last year, I found that the less planning I'd done prior to shooting a sequence, the more I would later be obliged to chop it up to make it work. Filming a long take obviously takes more work: you have to rehearse actors, co-ordinate timing and plan camera movements. In short, you have to know what you're doing and – perhaps more importantly – why you're doing it, which is perhaps why so many directors can't be bothered." Anne Billson said.*[22]

When talking about long take, many people might think about slow art movies which have a static camera, actors walking around inside the frame. We could say it's kind of long take also. But in commercial films especially high budget Hollywood films, it's absolutely different, long take is using to tell the story but its main purpose is also to create a dramatic and epic feeling for attracting audiences.

[22] https://www.theguardian.com/film/2011/sep/15/long-shot-film

Many long take shots appear in many independent films but the number is considerably less compared to high budget commercial films and it always less hot designing. It's not only about how difficult it but the main reason is about time in pre-production and post production and also budget to rent new technology stuffs to break the limited of camera movement. Long take required a lot of innovation and technology.

This chapter will also explain the advantage of digital technology such as digital cameras, steadicam and 3 axis gimbal. On the another hand, digital technology doesn't always have advantages. All problem of digital technology will also be listed.

Some new technology which now is still not popular in film industry because of many problem such as autofocus mode. It will be analysis in this chapter to show adavantage, disadvantage and also prediction the future of it. Nearly feature, it will become helpful function for film production.

2.1) Limit of technology

For about 100 years, movies have been an important part of culture. The history started from analog techonlogy to digital technology. Nowaday making movies almost related to electrical, electronics and computer technologies. Without having the development of technology, making movie seemed impossible. Shooting long take demands many technologies and innovations to support the idea of a director and cinematographer.

Independent filmmakers and low budget production also get some benefits from the quick development of technology. Many filmmaker's equipments become cheaper. Nowaday many filmmakers could have their own cinema cameras, steadicam and also 3 axis gimbal.

2.1.1) Break the limitation of length by digital camera

In 1948, Alfred Hitchcock tried to shoot long continuous take in *Rope*. But it's impossible because of the limitations of the film camera in that period, each

35mm magazine could only hold 10 minutes of footage. So Alfred Hitchcock solved this problem by creating an unreal long take, hiding edit by using a featureless surface.

It started by first shot which using dolly and ending at a featureless surface such as the back of a character's jacket and then following by another shot which start from the same point and zooming out. We could notice it is not real continuous take by unperfect transition of editing in this film.

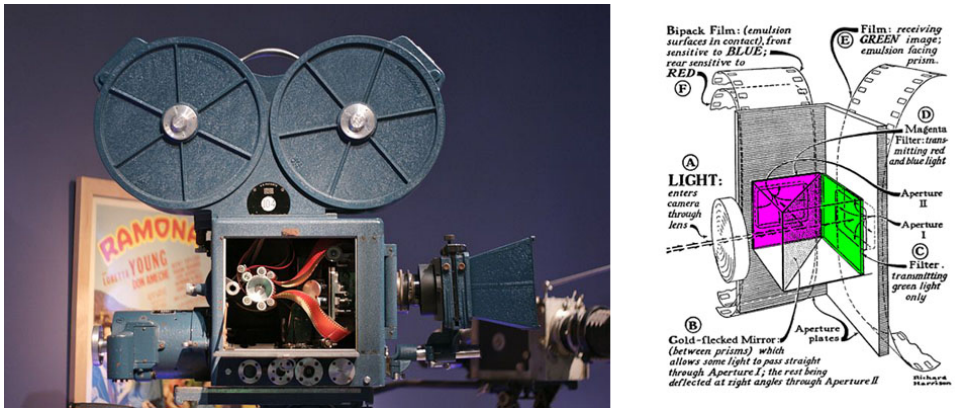

Figure 2.2 *Technicolor 3 Strip Camera & Prism Assembly Diagram* [23]

In 1964, film cameras was developed to capture longer. An experimeantal film name *Empire* by Andy Warhol and Jonas Mekas, used an 16mm film camera names Auricon camera which could hold 1,200ft roll of film and it could shoot continuous around 33 mins. "Empire" used 10 rolls of film and the final result become 485 mintues long.

[23] http://www.digital-intermediate.co.uk/examples/3strip/technicolor.htm

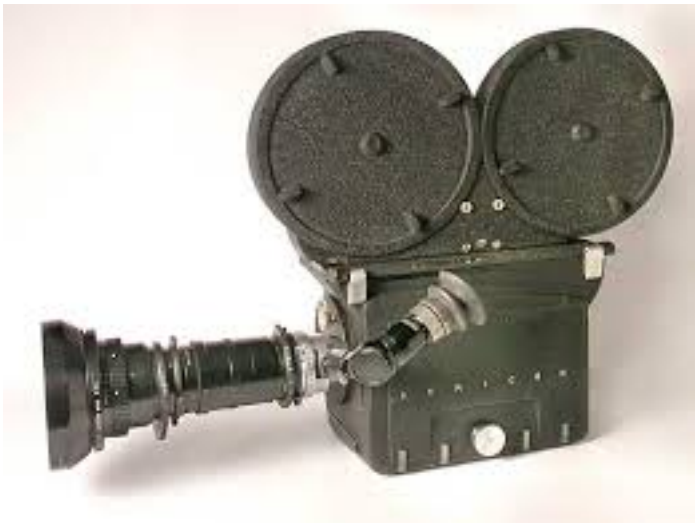

Figure 2.3 *16mm Auricon camera* [24]

For shooting continuous take techniques, the main problem of film camera is about limited size of magazine. Camera companies could produce larger magazine to carry more film stock but it would make the camera become heavier and larger. For continuous take which the final result equals shooting time, heavier and bigger equipment means a nightmare for a camera operator.

However, the arrival of digital cameras solved all such problems with the film camera. Changing the film stock to memory card, the size and weight is absolutely different. Most digital cameras could continue to record more than 2 hours depending on the file format.

Data Rates at 24p

Format	Data Rate	GB / Hour
MPEG2 422 HD	50 Mbps	20 GB / Hour
Panasonic GH4 4K	100 Mbps	45 GB / Hour
ProRes 422 (HQ) HD	220 Mbps	90 GB / Hour
XAVC 4K	330 Mbps	148 GB / Hour
AVC-Ultra 4K	400 Mbps	180 GB / Hour
Canon 1D C MJPEG 4k	500 Mbps	225 GB / Hour
ProRes422(HQ) 4K	880 Mbps	396 GB / Hour
Sony F5/55 Raw 4K	1.0 Gb/s	450 GB / Hour
Blackmagic 4K	1.4 Gb/s	630 GB / Hour
Red 6K WS (4:1)	1.4 Gb/s	630 GB / Hour
F65RAW (3:1) 4K	2.0 Gb/s	900 GB / Hour
Canon Raw 4K	2.3 Gb/s	1036 GB / Hour
Phantom Flex4K Raw	3.5 Gb/s	1.5 TB / Hour

Figure 2.4 *Data Rate at 24p* [25]

[24] http://phsc.ca/auction-special-lots.html

According to *Figure 2.4,* this table shows the size of files per hour by different types of format and cameras. Each camera has different formats, for example, Panasonic GH4 records at 4K resolution will give us 45 GB per hour and this camera uses a secure digital card or SD card. In 2016, from one of the most famous companies which produces many types of memory cards call SanDisk, the newest version of SD card from is Extreme PRO 512GB so it means combination between GH4 and Extreme PRO 512GB could record continually more than 10 hours long.

How about 4K Raw format, The result is closely to a negative film which convert to digital by 4K scanning process. By the way, 4K Raw format is very heavy in terms of size, around 1036 GB per hour. However do not forget that nowadays, the digital storage equipment such as external harddisk and memory card become cheaper everyday and the size of memory also bigger.

In 2015, *Victoria* by Sebastian Schipper, is the best film to support this topic. The whole film is 2 hours continuous take with out a cut by using Canon C300. We could sum up that this problems of limited length is solved by using a digital camera.

Figure 2.5 *Left: Arriflex, Right: Alexa M* [26]

Changing from film stock to hard drive also gave a great advantage to filmmakers. In the past, when filmmakers used film stock, many times of rehearsals are done before shooting. Because of the price of film stock, most directors and producers will allow to roll the camera until they believe in actors

[25] http://4khub.com/buzz/50/4k-camera-workflows-raw-video-proxy

[26] https://storify.com/sydneyshaw/digital-film-making-vs-celluloid-film

and crews.

But nowadays, in digital camera when people could easily record or erase footages from hard drive and the cost of recording is not the same as recording to film stock. While rehearsal is processing, record it does not make any disadvantage but it completely gives a huge benefit. Sometime wonderful things could happen during rehearsal. It does not make any sense to not record it.

Shooting long takes requires a perfect cooperation from many departments such as the camera operator, focus puller, actors, special effect and also grip. Many long take shot in final version of film is used from a rehearsal take.

By the way, the digital camera allows filmmakers to see final footage on set. Filmmakers could carefully check it after a take and adjust it immediately on set. When using a film camera, many times a director or cinematographer notice their own mistake in post production and it is too late to fix it.

2.1.2) Long take is required a compact camera

According to the previous topic, the limitation of film camera has to do with the size of a magazine. The camera company could increase the size of magazine easily but it would make a whole camera become larger and heavier also because cinema camera could not work without support equipment such as tripod, handheld rig, rods and baseplate. These supports have their own weight and are also limited by the weight of camera body.

Why is the weight of camera include all support is very important for long take shooting? We could imagine this importance very easily by holding something 10 kilograms or more continually around 10 mins to 2 hours without resting.

In 2015, Sturia Brandth Grovlen and Sebastian Schipper are both responsible and decided together carefully for choosing the camera for shooting their independnet film *Victoria*. In that moment, there were many digital cinema cameras on the market which were able to shoot a whole feature film in one take without cut. In this film, they made the final decision to use EOS C300 from

Canon company. Why it needs to be EOS C300?

Figure 2.6 *Canon cinema camrea C300 Mark II is very compact and lightweight.*[27]

	Panasonic GH2	Sony FS100	Canon C300
Price (body)	$699	$4,999 (E-mount) $5,398 (EF-mount)	$15,999 (EF or PL)
Resolution	1080p	1080p	1080p
Out of box codec	AVCHD 24 Mbit	AVCHD 28 Mbit	Broadcast ready MPEG 50 Mbit
External recording codec / souped up	180Mbit AVC Intra 4:2:0 8 bit internally	Uncompressed 4:2:2 8bit via HDMI	Uncompressed 4:2:2 8bit via HDSDI
Maximum ISO	12,800	25,600 (30db)	20,000 (actually = 6400 on 7D, FS100)
Sensor	Almost Super 35	Super 35	Super 35
Sensor size horizontally in mm	19mm	22mm	22mm
Moire, aliasing	Minimal	Minimal	Virtually none
Slow mo	720p	1080p (60 fps)	720p
Lens mount	Micro Four Thirds	E-Mount	EF or PL
Flange back (higher = less adaptable)	20mm	20mm	44mm
ND	Matte box / vari	Matte box / vari	Built in
Audio jack	2.5mm	XLR	XLR
Monitoring	1080i, gamma shift	1080p	1080p
Peaking	No	Yes	Yes
EVF	Built in	Detachable toilet roll	Built in
Ergonomics	DSLR	Weird	DSLR / XL hybrid
Weight	200g	1kg	1.4kg
Zebra	Yes	Yes	Yes
Manual audio	Yes	Yes	Yes
AF	Yes (Lumix lenses)	Yes (E-mount lens)	No
Optical IS	Yes (Lumix lenses)	Yes (E-mount lens)	No
Build grade	Consumer	Semi-pro	Pro
Rolling shutter	Average for DSLR	Minimal	Very minimal

Figure 2.7 *C300 has many functions such as build-in ND filters, high ISO and lightweight.*[28]

[27] https://www.bhphotovideo.com/c/product/1134579-REG/canon_0635c002_eos_c300_mark_ii.html

[28] http://www.eoshd.com/2012/01/dispelling-the-myths-is-the-canon-c300-worth-15999/

"When Sebastian first talked about the one take, it was the first camera thought of. I'd worked with the C300 before on documentaries, so I knew it was a camera I was comfortable with, I needed a camera that recorded that long, had a battery that lasted that long, and that was lightweight. I also needed the light sensitivity. We shot at ISO 2000. I didn't really test other cameras, but I did do a lot of tests on the C300, with different lenses, to see which one provided the best balance of aperture and weight. I quickly went away from the idea of using a recording device. I thought about the C500, but felt very comfortable that the C300 could do the job. I didn't feel I could gain much more from the C500 from this setup. It's a little bit bigger and a little bit heavier, and I was counting every gram."[29]

Firstly, Sturia Brandth Grovlen thought about the weight of camera include lens and accessories carefully because during the whole shoot, he needs to use a handheld camera without resting for 2 hours. Canon C300's body weight is around 1.4 kg. When including lense and accessories, it could go up to around 8 kg. Sturia Brandth removed all unimportant accessories and made it as compact as possible. Compared to Arriflex 235 which weighs around 3.5kg without film stock, the difference is significant. The small weight of 2.1 kg means a lot to camera operators when they have to handheld a camera for 2 hours. Moreover, the evolution from analog to digital gave the ability for filmmakers to choose the best equipment by quality of each project.

How about comparing between digital cameras? We could notice that most of the digital camera companies have started to reduce the size of the camera body and make it as compact as possible. But the quality is still awesome. For the high end camera, Arri Alexa XT plus is one of the most famous digital camera which high budget feature films and also television commercials have often used.

[29] http://cpn.canon-europe.com/content/education/technical/filming_victoria_movie_in_one_take.do

Figure 2.8 *Comparing size between Alexa Mini and Alexa SXT Plus.*[30]

Alexa Mini is smaller compared to Alexa SXT Plus. Both are using the same censor and could also could ArriRaw. The Alexa Mini body weigh only 2.3 kg, compared with the Alexa SXT Plus body which weigh 7.3 kg. We could clearly notice the direction of digital camera designing.

2.1.3) Less sensitivity of film stock requires more light

When we talk about capturing the image, choosing the right camera for each project is one of the most important responsibilities of the cinematographer. Without lighting, whatever camera you are using could not capture image.

Sensitivity or film speed is one of the major limits for film stock because less sensitivity means more light. In 2007, Kodak introduced, the newest tungsten white balance film stock, 5219 / 7219 VISION3 500T. In 2009, 5207 / 7207 VISION3 250D is introduced as a newest daylight white balance film stock. Both of them, are still using as present.

[30] http://nofilmschool.com/2015/02/arri-alexa-mini-smaller-package-price-cost-release-date

Figure 2.9 *Kodak Vision3 250D and 500T* [31] [32]

What is the difference between the sensitivity of film stock at 500 and 1000? It means double time of power of light. For example, if a light source has a power output at 300w. then by using light meter and using film speed at 1000, we could measure the intensity for normal exporsure at F2.8. But if we change a film speed to 500, the measuring by light meter will decrease to F2.0. It means we need to change power of light source to 600w or we need to open one F-stop of lens more to make both situations become equal.

For renting more powerful lights, more crew is required and also more power by generator. The high budget productions do not have problems related to budget. But for small budget productions such as an indie films, it is a bit of an issue. Requesting one more lamp for lighting could create budgetary issues.

Nowadays in the digital world, sensitivity of camera is not a problem at all and every consumer can buy a camera with high sensitivity such as Sony Alpha A7S, This camera has a maximum ISO at 409,600, which compared with the maximum of tungsten film stock of only 500.

Figure 3.0 *Sony A7S. From left to right: ISO 800, 51,200, 409,600* [33]

[31] http://emulsive.org/reviews/film-reviews/film-review-35mm-kodak-vision3-250d-motion-picture-film-5207

[32] https://www.pinterest.com/kodakshootfilm/kodak-motion-picture-film-stocks/

[33] https://www.photosincolor.com/sony-a7s-high-iso-test-shows-shooting-at-night-with-ease/

But why do we need so much ISO? Because filmmakers will have more options to shoot with less light, which means they can move about more easily and shoot in more locations such as dark places that were previously impossible to capture adequately.

From film camera to digital camera, the way to light the scene is almost changing. Especially for a commercial look which requires soft light and less contrast ratio. A big soft light source is required. But from using many giant light sources to light the scene to be as a key light, fill light and back light, now it becomes only lights which are smaller and have less power output such as Kino flo. By the way, the idea of lighting is still the same.

Victoria by Sebeastian Schipper, has 22 locations and its location is around downtown Berlin. In this film, characters transport from one location to another location by car. *Victoria* was shot in the early morning and most of lighting is from practical lamps and also natural light. Sensitivity of camera pushes up to 2,000 to make it possible for capturing all situations in this film.

2.1.4) Steadicam inventor reveals the impossible shots that changed filmmaking forever.

In 1920, Cranes and dollies were widely used by filmmakers to create smooth movement. A dolly became one of the most important tools for filmmakers. Around 90% of Hollywood films have at least one shot using dolly.

By the way, dollies still have some disadvantage, they are limited by direction or length of rails. Forexample, if a cinematographer wants to track camera by dolly around 30 meters far, it means 30 meters long of rails are needed. Time for preparing dolly and amount of crews are increased.

Many companies that produce dolly equipments such as J.L. Fisher, create many options to solve this problem such as a Pnuematic Wheel. It makes it possible for a dolly to move on a ground without rails but the ground need to be very smooth and clear.

Figure 3.1 *JL fisher 11 with Pnuematic wheels* [34]

In 1973, Garrett Brown presented the first steadicam and it is not just only an image stabilizer, but a perfect instrument to move the camera through space without limitations. A steadicam provides two main advantages.

First, it creates a stabilized steady footage which is similar to dolly shots and the flexibility of handheld camera work. All jerks, bumps and shakes effects which are created by a camera operator's movement are almost absorbed.

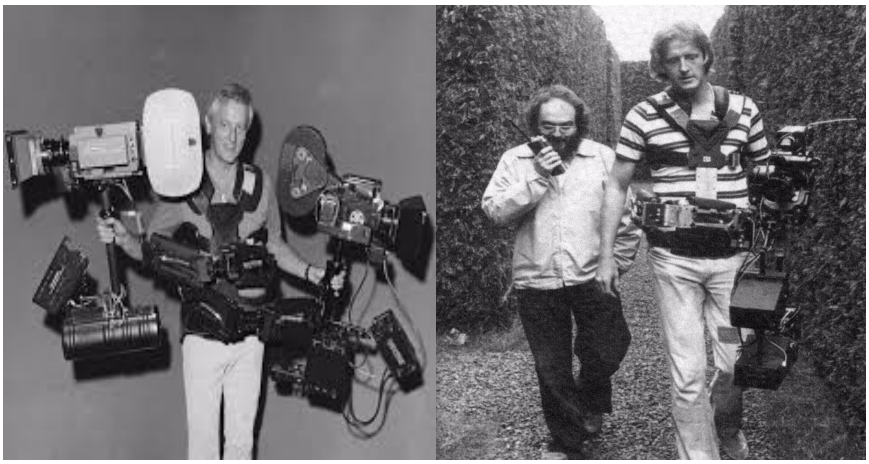

Figure 3.2 *Left: Steadicam creator Garrett Brown, Right: Brown with Stanley Kubrick on set of The Shining (1980).*[35] [36]

Why is the steadicam so very important for long take techniques? This question is answered by comparing *Rope (1948)* and *Birdman (2014).* When

[34] http://www.ecrent.com/JL-FISHER-11-1744161

[35] http://www.garrettbrown.com

[36] http://cinearchive.org/post/80892559955/garrett-brown-the-inventor-of-the-steadicam

Rope was shot, using dolly or crane was the only way to create camera movement. The movement was very limited because it dependeds on the length of dolly rails and size of dolly plates compared to the size of location. But steadicam solved all of those problems. This is senn in Birdman where the camera movement is almost free of any hindrances because of the complex size of steadicam, including the smooth movement.

2.1.5) While The Steadicam is changing the professional filmmaker world, 3 Axis stabilisers also changing the independent filmmaker world.

40 years later, the Steadicam has almost changed the way of filmmaking. Filmmakers use steadicam for making long shots and the possibility of moving the cameras to a new level. Most industrial filmmakers use steadicam to replace the dolly or crane. Shooting long takes have become famous. Some of it is so fantastic but some of it is so pointless.

By the way, the cost of steadicam is expensive and only high budget film production have the possibility to use it. The price for renting or buying steadicam equipments and hiring a professional steadicam operator is also high.

In 1997, the cheap version of the steadicam is produce by Glidecam. With this, many independent filmmakers and also low budget filmmakers could have their own steadicam. Glidecam use the same working system as a high-end steadicam like Tiffen but it supports only a small camera such as DSLR or light weight camera. The biggest model of Glidecam, Glidecam Devin Graham Signature Series, could holds a maximum of weight up to 5.44 kg, compared to the latest steadicam model from Tiffen which could carry weight up to 22 kg.

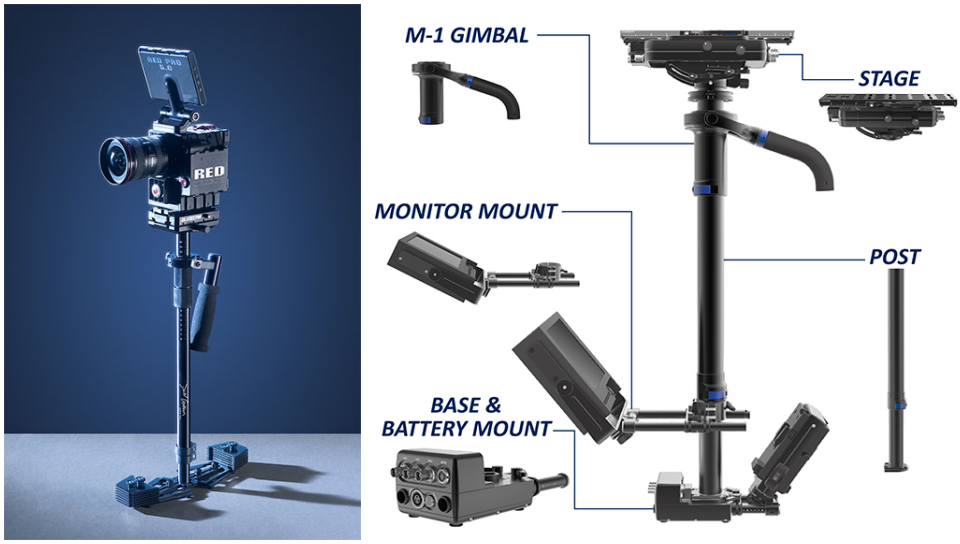

Figure 3.3 *Left: Glidecam Devin Graham Signature Series, Right: Steadicam M-1 from Tiffen.*[37] [38]

The price of steadicam is not only a disadvantage but the mechanic system and how difficulty for operating seem to be biggest problems. For operating steadicam, a steadicam operating needs to learn and practice for a year or more. It's impossible to be a master for operating steadicam in a week or month.

Several years ago, DJI Ronin 3-Axis Brushless Gimbal Stabiliser and Movi were introduced. This fixed the shaking of image problem and allowed fo unlimited movement the same as steadicam did, but was easier to set up and operate. The price of DJI Ronin is two or three times cheaper than steadicam.

[37] http://glidecam.com/product-devin-graham-signature-series

[38] http://tiffen.com/steadicam/steadicam-m1/about-steadicam-m1/

Figure 3.4 *Left: Movi M10, Right: Movi M5.*[39]

Comparing the price between the Steadicam Scout model from Tiffen and DJI Ronin 3-Axis Brushless Gimbal Stabiliser, Steadicam Scout rises up to $6,050 but DJI Ronin 3-Axis is only $2,500. Both of them could carry the same weight (16 pounds).

With support from electronics in 3-Axis stabiliser, to set up and operate are very simple. An operator could spend one or two days to learn it and become master. The operator just need to put a camera on the plate and make it balance by finding the centre of gravity. Turn on its power and 3-Axis stabiliser will automatic balance. The operator could adjust speed level of panning and tilting by a mobile phone or a computer. 3-Axis stabiliser comes with a remote control which allow two operators to help each other to operator a camera. One person operates a directing and another one focuses on tilting and panning.

By the way, most long takes in high budget film are still shot by steadicam more than 3-Axis stabiliser. Many steadicam operators say that to operate 3-Axis stabiliser is difficult for framing and composing compare to steadicam. But for my opinion, 3-Axis stabiliser is a great tool and the main purpose is for low budget films or independent filmmakers.

[39] http://www.newsshooter.com/2013/07/15/freefly-announce-movi-to-ship-m10-in-30-days-cheaper-m5-version-to-cost-4995-us/

2.1.6) The amount of steadicam operators is less compared to demand from industry.

Referring to the previous topic, learning to use a steadicam is very difficult because the price of equipment is expensive and not many operators could become masters.

Many steadicam companies try to support and solve this problem. For example, Tiffen, the biggest steadicam company always offer steadicam workshops. These have three levels and they are considered to be the best education for steadicam operators. But there is a limit of only 15 students allowed per class which is still not enough to create many steadicam operators.

Figure 3.5 *A stedicam operater's workshop from Tiffen.*[40]

Comparing the amount of steadicam operaters with the demand is completely different. Some places which have a huge film industry will not have this problem, such as Hollywood where most of workshops are happening, but for countries which have a small film industry, finding a good steadicam operator is a big problem.

Somsak Srisawat is one of the best steadicam operators in Thailand, where film industry is quite small. His name appears as the steadicam operator in many international film production such as *Only God Forgives*, *Bangkok dangerous* or *The Protector*. One of the most famous long take scenes which he shot is from *The Protector*.

The Protector is a martial art film so most of the movement of actors is always very fast especially in fighting scenes.

[40] http://www.tiffen.com/steadicamworkshops/photos.shtml

Figure 3.6 *Four mintues long take scene from The protector (2005)*[41]

Four mintues of long take, starting from the ground floor until the fourth floor, continuous fighting without rest, more than 30 stuntmen and extras, hundreds of set effects and props are set in this scene. We could imagine how many hours to reset all this set up if something goes wrong. But one of the most difficult parts of shooting the long take in this film is finding a steadicam operator who could follow the action and who is great enough to catch the quick movement of Tony Jaa.

For a Thai film which doesn't have a lot of budget compare to Hollywood film, hiring a master steadicam operator to join the crew is difficult. The limited amount of professional steadicam operators in Thailand is almost a nightmare for a Thai producer and director. Most of the professional steadicam operators in Thailand are working full time by shooting TV commercials which are well paid.

2.1.7) The Adoption and Fusion

A camera stabiliser becomes one of the important tools for shooting the mobile long take. We can start by looking at the steadicam and then 3-Axis stabilisers which are easy to use and are low priced. But both of them still have their own weaknesses.

Steadicam has the limitation of a system that allows people could mount the camera on one side of sled, which is on the top or on the bottom of it. It is called High mode and Low mode. Because of this weakness, it is impossible to change from High mode to low mode while shooting. Some situations however require the steadicam operator to change the mode during a shot, but the image

[41] https://www.youtube.com/watch?v=zESe7U467vs

will turn upside down after changing the mode.

Figure 3.7 *Left: High mode, Right: Low mode.*[42] [43]

For shooting a mobile long take, more freedom of camera movement means more creativity of shot design. Forexample, if the cinematographer decide to follow the feet of actor at the ground level who is walking in the beginning of the shot then in the end, the camera needs to move up to his face at eye level . This result could not be created by using steadicam but 3-Axis stabiliser could make it.

It is absolutely normal that many amazing technologies coming from the combination of two or more technologies. The steadicam system and 3-Axis stabilisers are also predicted to end up by fusion and adoption. Many operators try to merge it together and it breaks the limitation of the steadicam and 3-Axis stabilisers.

[42] https://en.wikipedia.org/wiki/Steadicam

[43] http://www.ebay.com/itm/Flycam-6000-Steadicam-with-Proaim-7000-Reverse-Arm-and-DV-Operator-Vest-/251274989689

Figure 3.8 *Combination between 3-Axis stabiliser and Steadicam.*[44]

By putting the 3-Axis stabiliser on the steadicam sled, it allows the operator to go from the top of head to the feet in one take without an upside down image. Because when turning 3-Axis stabilisers upside down, it will not affect the level of the camera.

2.1.8) Multiple shots blended digitally in post production

In the history of cinema, many filmmakers try to merge multiple shots together and make it look like one continuous long take. For example, Alfred Hitchcock tried to make a long continuous take in *Rope* by using a featureless surface of actors to hide editing. But the result is almost noticeable.

From 1948 to 2006, The opening scene of *Children of men* show us how digital post production is improved. This scene is shot in two days. On the first day, the shooting happens only inside the café and on the second day, it is outside cafe. By using the café's doorframe as a transition, this scene absolutely looks like one continuous long take.

[44] Fu Dakun, The challenge and future of Steadicam, 2016

Figure 3.9 *The opening scene of Children of men (2006).*[45]

In 2014, *Birdman* by Emmanuel Lubezki who is the same cinematographer of *Children of men*. 119 mintues of entire film look like one continuous take. Many multiple shots were melded together in digital post production.

Nowadays, to create a long continuous take seems easier because of digital post technology. The camera is also smaller and better. Many types of equipment have been introduced to support shooting mobile long take.

2.1.9) Autofocus in digital camera

Auto focus was introduced for still camera to help the photographer to take a photo faster and accurate. But for shooting a motion picture, it is too complicated for camera companies to produce a cinema camera which have a great auto focus function.

For shooting the mobile long take, the camera always moves in different directions. All focus points change depending on the situation, actors and camera movement. A lot of marks have been put on the ground to mark position of actors, camera operator and for the main purpose of the focus puller, which is to check focus points.

To keep all focus depth into sharpness, for complicated moblie long take, it is especially challenging for the focus puller and especially if using the widest opening aperture with long-focus lens such as 50mm or 85mm.

In a high budget production, hiring a professional and experienced focus puller seems normal but this is not the case with an indie film or one-person

[45] https://www.youtube.com/watch?v=wCTgUq6hzUk

shooting.

Yet even, in major film productions, mistakes of focusing always happen. Time is required for the focus puller to adjust and practice focusing.

Canon, introduced many models of Canon cinema cameras which have auto focus functions but they need to be used with correct lenes which have autofocus function also, such as Canon EF lens and especailly the L series lense, which is the highest model of Canon lens. This makes for faster focusing compared with non-L series. Canon cinema camera designs for a variety of works such as documentary, wedding, event, music video and also feature film.

Figure 4.0 *Left: C100 Mark II, Center: C300 Mark II, Right: C500*[46]

Face-detect AF is one example of a great auto focus function from Canon technology. It processes to keep focus on the face of actor. If in the shot, we have only one actor and want to keep him or her focus all the time, then this function will absolutely make it.

Several years ago, another function which would become a future of focusing was released, called refocusing function. In the beginning, it was released only in still photo cameras. It allowed people to refocus any focus points inside image after taking an image already.

In 2005, Panasonic introduced this filmware into its cameras, some models could shoot 4K resolution but with a Micro Four Thirds sensor such as Lumix DMC-GX 8.

[46] https://www.usa.canon.com/internet/portal/us/home/products/list/cameras/cinema-eos/cinema-eos

Figure 4.1 *Lumix DMC-GX 8 from Panasonic, shooting 4K video.*[47]

Panasonic called this function as Post Focus. It shoots 25 frames in a second, similar to any film or cinema camera, but it scans the scene from front to back and shoots the frames to cover every focus distance. We could adjust a focus point in post production if images are not in focus or soft focused. As we know, any mistake could happen while shooting.

By the way, this function is not working perfectly until now. Many problems are still waiting to be fixed. If the scene is very complicated by panning, tilting and camera movement, this function could not capture all focus distances. But many people predict that this function will become perfected soon and it will change the world of filmmaking. Many mistakes while shooting mobile long takes would be solved by this function.

2.2) Planning for a mobile long take scene is so complex.

Technology is an important part for shooting long take especailly mobile long takes, but it doesn't mean that with the best camera equipment, shooting long take will become possible. The equipment only supports the work of the filmmakers.

Shooting long take is very challenging for the director, cinematographer, set designer and also all crews members because so many parts need to be controlled without any mistakes. Production is always limited by time and budget. Sometimes the director and cinematographer have only one or two

[47] http://www.amateurphotographer.co.uk/reviews/compactsystemcameras/panasonic-lumix-dmc-gx8-first-look

chances to shoot a long take shot. As we know, the more preparation in pre-production always means less problems in production and post production. Still, unpredictable problems, such as accidents, can always happen while production is running.

While the long take scene in *Children of men* was shot, Alfonso Cuoron had 12 days to do the car attack scene which become one of the masterpiece for mobile long take. If Alfonso could not finish this scene in 12 days, he was going to lose the location. Most of the days were spent on staging and only 2 days were left for shooting. Because of how complicated was the scene, he could shoot only 2 takes per day. On day 11, an accident happened, so he did not get the result he wanted. On the last day of shooting, the first take was going well but then an operator fell down. He had only one last chance to make it and finally he could managed. We could note in this example how complicated and difficult it is shoot a long take. *Children of men* was such a big Hollywood film production. They had budget, time for preparing and shooting but problems still happened. For independent films, without budget and time for shooting, spending time for preparing is the best chance to make long takes become true.

Figure 4.2 *The car scene in Children of men (2006).*[48]

2.2.1) A Special innovation makes impossible long take shot become possible

Many specific situations require special equipment. Preparing in pre-production will make filmmakers know what they need and also prepare themselves to solve problems in production.

As we know, shooting a long take is double or triple the time and difficulty

[48] https://www.youtube.com/watch?v=QfBSncUspBk

compared to shooting in the normal way. To create freedom of camera movement for supporting the director's imagination is not only related to processing and mastering a steadicam or a 3 Axis-stabiliser. Sometimes, a special innovation is required.

In the car scene of *Children of men*, the whole scene is filmed inside the car while it moving. The main problem is about choosing the best equipment to support this idea. Steadicam is too large for this situation. Handheld and 3 Axis-stabiliser is very close but it seems impossible to hide a camera operator if the camera needs to move almost 360 degree.

Alfonso Cuaron and Emmanuel Lubezki came up with a fantastic idea by creation a special rig for this single shot. It allowed them to move the camera inside the car with almost complete freedom without seeing a camera operator and also capture everything inside and outside the car in the same shot.

Figure 4.3 *Doggicam system was created for the car scene in "Children of men (2006)".*[49]

2.2.2) More time for blocking and rehearsed in complicated long take shot

Time for all stages of the shoot is one of the big problems when filmmakers discuss about making a long take shot. Basically the stages of shooting a film start by Blocking, Lighting, Rehearsings, Tweaking and Shooting. We could notice how much time, we need to spend for those 5 stages.

[49] https://shotonwhat.com/children-of-men-2006

Blocking refers to the positioning and movement of the actors on the stage. In cinema, blocking gives a precise idea to crews for working in the same direction especially camera, lighting and grip departments. The more clear and steady the blocking, the speed will be increased in the remaining stages. For a long take shot, real solid blocking is needed because changing a position of an actor means changing a camera position and lighting.

Many times, blocking and rehearsal happen on the real set or two days before shooting at the real location to allow the director and cinematographer to adjust the positions of the actors and the camera positions. But for shooting a long take is different.

While Alfonso Cuaron shot *Bird man*, all blocking and rehearsal took place in Los Angeles but the real location is in New York. It happeneds weeks or months before the shooting period. The director and cinematographer designed the shot together by using a handheld camera and timing all actions to make it smooth. Many marks appear on the ground to match the position of doors as same as the real location which was still being built in New York. As the Steadicam operator Haarhoff said:

> *" If we found that a hallway needed to be extended to cover a scene, they would send that information to the set builders in New York so it would fit into what we were trying to do in Los Angeles."* [50]

Figure 4.4 *Behind the scenes from "Birdman (2014)".*[51] [52] [53]

To sum up, we could not avoid the problem of spending time on blocking and rehearsal while shooting a long take because how much time we spend on it,

[50] http://soundandpicture.com/2014/11/birdman-interview-steadicam-operator-chris-haarhoff/

[51] http://www.btlnews.com/awards/for-your-consideration/oscar-nominated-cinematographers-offer-an-impressive-array-of-unique-looks/

[52] http://filmconnoisseur.blogspot.com/2015/01/birdman-2014.html

[53] http://waytooindie.com/news/behind-the-scenes-look-at-the-filming-of-birdman/

the better result we will get.

2.2.3) Problem of time and dramatic in an entire long take film

The technical part is a different thing when compared with the time management which is about keeping the situation always sharp or keeping the trains running on time. Without editing, 10 mintues of a footage give a result of 10 minutes of long continuous take. The way to make it not boring to audience is challenging to filmmakers.

Many directors have different styles for directing their films. For the long take film, the way that they direct their films becomes even more different.

Figure 4.5 *Victoria (2015)* [54] [55]

The Victoria (2015) which is 2 hours continuous take without a cut, directed by Sebastian Schipper is the best example. He had 12 pages of the script on which was written only situations and main topics of dialogue. He focuses on improvisation of actors to make it look natural because rarely do professional actors have the talent to remember all dialogues and blocking for exactly the entire film.

For shooting the long continuous take, the fewer limitations given to actors would make his film become more flexible and successful. By the way, Sebastian wrote this script which he predicteds would be around 2 hours then he spent many days for blocking and rehearsal to make all situations more compact.

One of the more noticable aspects in *Victoria*, is the amount of situation

[54] http://www.esquire.com/entertainment/movies/reviews/a38643/victoria-movie-2015/

[55] https://www.youtube.com/watch?v=C_VjtxZYBCI

between actors, is higher than compared with a non-continuous take film. This was done to keep the story still interesting. In this film, there are many situations which bring audiences into different moods such as romantic, dramatic and also action.

For the cinematography part, using handheld camera is really important to support this film. It increases the dramatic feeling for the action scenes but when the romantic scene was shot, a camera operator tried to make it with a camera stabilizer, but still keep a realistic feeling through the handheld effect.

All of these work processes are absolutely different from the way of usually making a film, which always requires a complete version of a script. This working process is closer to documentary style but this film does not look like documentary at all.

To sum up, a simple script, increasing situations to the story then compacting it by blocking and giving less limitations to actors are the best ways to solve problems of time management and attracti audiences to follow the story.

2.2.4) Lighting the scene is not complicated but for one continuous take is YES!

Great visual style and lighting are required as basic skills of any cinematographer. Many famous cinematographers always cooperate with gaffers who have deep knowledge about lighting. For lighting the scene is very challenging but some cinematographers and gaffers could do it as same as if it is one part of their bodies. But for lighting a complex steadicam or handheld scene with camera movements that move around the set from one set to another set, then using basic ways of lighting is impossible.

According to topic *2.1.3) we spoke about how less sensitivity of film stock requires more light*, and that the highly sensitive camera is require to light the complex one contiunuous take. We have also mentioned that using as many practical sources in the set as possible is the best way to light the scene. It allows for freedom of character and camera movement and also gives a naturalistic sense of light.

Figure 4.6 *Birdman (2015)* [56] [57]

In *Birdman (2014),* Emmanuel Lubezki uses well-placed practicals not only to light the scene but to create beautiful and dramatic staged effects, which are the more difficult part of lighting. Emmanuel said in a Hollywood Reporter article,

> *That is because, for instance, the light that is lighting Michael at his makeup mirror will create a shadow a minute later if we move around the room. So we had to time all of the lighting changes, making sure you don't see shadows. We were moving lights; we were moving diffusions. There were grips moving with me. Every time you see a shot, there were eight people moving with me. It was like a ballet that's what made it truly exciting.*[58]

Birdman and *Victoria* are enough cases studies to show us how they solved the problem of lighting the entire scene while shooting mobile long takes. Both of them are different scale of production but they still kept lighting as possible by working with practical lights and natural light.

2.3) Weakness of long take compared to the editing function.

The beauty and amazing effects which can be created by long take are always discussed by filmmakers. However, long take are not always a good thing. The long take technique has limitations and weaknesses. A comparison with the editing function may be the best way to explain these differences.

Capturing action and reaction is not easily shown in a long scene

[56] http://www.hidefninja.com/2015/03/08/birdman-blu-ray-review/
[57] http://www.hollywoodreporter.com/review/birdman-venice-review-727190
[58] http://acinemaniac.tumblr.com

sequence. Referring to, Goal and structure of long take at the beginning of this thesis, we could say that they work by combining many shots together, like editing, but shown in a single shot. The action of the characters is melded with the reaction of others and this requires time for the camera to move by panning or tilting. In many films such as *Birdman* the camera operator whip-pans very fast to keep pace with the reaction of the characters and follow the rhythm of the scene.

The film *12 Angry men (1957)* directed by Sidney Lumet has two different scenes which use disparate methods to capture the action and reaction of the characters as long take and editing.

Figure 4.7 *"These People" in 12 Angry men (1957)* [59]

In the scene *These People*, a long take begins with a medium- shot of one character who starts to fidget and complain to his colleague. The camera then dollies back and changes the size of the frame to a long-shot. His colleagues react by standing with their backs to him. The reaction is noticeable but it does not inspire any drama or power of emotion to the audience.

Figure 4.8 *"It is the Same Knife" in 12 Angry men (1957)* [60]

In another scene *It is the Same Knife!*, the whole scene shot uses fast editing while cuts quickly from close-ups of one character to close-ups of others

[59] https://www.youtube.com/watch?v=TXlHKTPfLVA

[60] https://www.youtube.com/watch?v=TUzp2XUhskY

to show their action and reaction. This technique successfully uses the editing function to create the intensity of the scene.

Capturing action and reaction simultaneously using a long take technique decreases the dramatic effect because the audience receives both pieces of information in the same way.

One benefit of the long scene shot is to allow the eyes of the viewers to pick and choose what they think is important and absorb every detail on the screen instead of being guided by the editing function. However, this is not always beneficial and can become a weak point of long take technique.

Filmmakers direct their audiences to focus on the important points within the frame. There are many ways to do this such as by lighting, camera movement, frame composition or depth of field.

The dynamic images and eye movements (DIEM) project[61], created by professor John M. Henderson of the University of Edinburgh, is an investigation into how people look and see during dynamic scenes in films, music videos or advertisements. Results show that people track their eyes following the movement inside the frame. For example, in a scene with three characters in conversation around a table, viewers' eyes follow the characters who are talking or show movement such as lighting a cigarette. Their eyes automatically track movement rather than dialogue. Movement is the most attractive instinct of the audience.

To direct the eyes of the audience during a long take becomes very complicated because long shot times allow more focus on the environment rather than the characters. On the other hand, editing scenes by quick cuts easily directs the focus point of the viewers.

Many directors solve this problem by increasing the movement of the main elements and decreasing it for less important elements. In a 135 seconds long scene from *Magnolia (1999)* directed by Paul Thomas Anderson, the camera uses Steadicam to follow seven different characters.

[61] https://thediemproject.wordpress.com

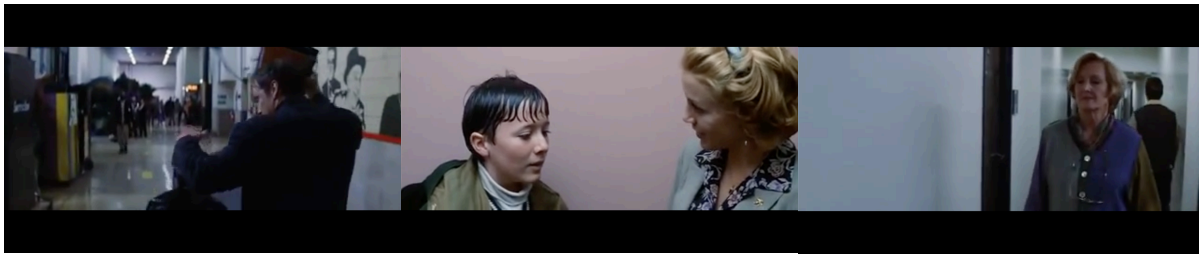

Figure 4.9 *Magnolia (1999)*[62]

The main elements of the seven different characters are their heavy and noticeable movement compared to the less important elements in the scene environment.

Another clear example is in *The Shining (1980)* directed by Stanley Kubrick. One entire scene follows Danny riding a tricycle around a hotel. The audience can only focus on Danny because he and his tricycle are the only two objects with movement.

[62] https://www.youtube.com/watch?v=dDMdzg_QmxM

Conclusion

The art of the long take technique has developed from a static long take to mobile long take. Many filmmakers attracted to telling a story using this technique have improved the dramatic effectiveness with the help of improved technology.

The art of the long take is a beautiful, impressive and mesmerising tool available to the filmmaker. It allows the audience to really get comfortable in a scene, absorbing all the details and happenings without any editing. Real time can be utilised as an interesting way to tell the story. However, long take technique are not a perfect tool and have some weak points. The film director must take care when using long take to direct the audience to focus on the important elements inside the frame while capturing action and reaction.

To create a powerful impact using the long take technique is very difficult and complicated. It requires a lot of effort, talented crews, a healthy budget and great creativity. With the development of digital technology many of these issues have been solved, making the technique easier to use well by independent filmmakers.

So, is it worthwhile or not to spend time and budget on the long take effect? In my opinion, the long take is just one of the many powerful storytelling tools available to the modern film director and its use will not provoke a positive reaction from the audience every time. If a filmmaker uses the technique wrongly, then the story line may become boring for the viewers.

Bibliography

Dakun, Fu (2016). "The challenge and future of Steadicam".

Le Fanu, Mark (1997). “Metaphysics of the ‘Long Take’: Some Post-Bazinian Reflections.”: 15

Henderson, Brian (1971). “The Long Take,”: 6-11.

Henderson, Brian (1976) ‘The Long Take’ in Nichols, Bill (ed.) *Movies and Methods 1*. Berkeley: University of California Press, 315.

Isak Nielsen, Jakob (2007). " Camera Movement in Narrative Cinema ".

Salt, Barry (1992). *Film Style and Technology*: *History and Analysis* (2 ed.). London: Starword.

Totaro, Donato (2001) ‘Time and the Long Take in *The Magnificent Ambersons*, *Ugetsu* and *Stalker*’. Unpublished PhD Thesis, University of Warwick.

Filmography

12 Angry men, Dir. Sidney Lumet, Orion-Nova Productions, 1957

Atonement, Dir. Joe Wright, Universal Pictures, 2007

Bangkok dangerous, Dir. Danny Pang Phat and Oxide Pang Chun, Initial Entertainment Group (IEG), 2008

Birdman or (The Unexpected Virtue of Ignorance), Dir. Alejandro Gonzales Inarritu, New Regency Pictures, 2014

Boogie Night, Dir. Paul Thomas Anderson, New Line Cinema, 1997

Citizen Kane, Dir. Orson Welles, Mercury Productions, 1941

Children of men, Dir. Alfonso Cuarón, Universal Pictures, 2006

Magnolia, Dir. Paul Thomas Anderson, Ghoulardi Film Company, 1999

Only God Forgives, Dir. Nicolas Winding Refn, Space Rocket Nation, 2013

Rope, Dir. Alfred Hitchcock, Warner Bros., 1948

Sunrise: A song of Two Humans, Dir. Friedrich Wilhelm Murnau, Fox Film Corporation, 1927

Victoria, Dir. Sebastian Schipper, The State Hermitage Museum, 2002

Russian Ark, Dir. Aleksandr Sokurov,

Touch of Evil, Dir. Orson Welles, Universal International Pictures (UI), 1958

The Cranes are Flying, Dir. Mikhail Kalatozov, Mosfilm, 1957

The Protector, Dir. Prachya Pinkaew and James Glickenhaus, Sahamongkolfilm Co., 2005

The Revenant, Dir. Alejandro Gonzales Inarritu, Regency Enterprises, 2015

The Shining, Dir. Stanley Kubrick, Warner Bros., 1980

Goodfellas, Dir. Martin Scorsese, Warner Bros., 1990

Week End, Dir. Jean-Luc Godard*,* Comacico, 1967

List of figures

Figure 4.8 "It is the Same Knife" in 12 Angry men (1957)

Figure 4.9 Magnolia (1999)