World-Horizon Expanded:

Astronautics, *Earth-ground*, and The Space Exploration Science Fiction Film

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ABSTRACT

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This thesis explores the issue of world-horizon, as well as its essential role in the interaction and interfusion of film experience and everyday perception. By examining the images of Earth and Space in the science fiction films belonging to the subgenre of Space exploration and those in non-fictional footage produced in the context of live television broadcast and scientific astronautics, I attempt to show how the perceptual and the imaginary worlds infiltrate and influence each other. I argue that Fritz Lang's 1929 *Frau im Mond* (*Women in Moon*) played a crucial role in the history of this subgenre and in the broader horizon of real astronautics, for it blazed the trail of the embodied tradition that served as an alternative to the speculative methods used in many other science fiction films, expanded the horizon of the general public by treating science and astronautics seriously, and even contributed directly to modern rocketry and Space programs through its sponsorship of research in real rocket and its use of visual codes and syntagmas that later became the standard visual syntax and semantics for live television broadcasts. In turn, live television broadcast later established the standard for the audiovisual experience of real astronautics, whose visual codes and syntagmas then went back into more contemporary Space exploration films, such as *Gravity* and *Interstellar*. The latter films made full use of those established audiovisual codes and created a kinaesthetically affective and emotionally immersive world-horizon by pushing further the embodied tradition that had started with Lang's film. Although I find in this particular subgenre the inherent logic of the world-picture that tends to turn Earth and Space into mere objects, an alternative way can be found through close analyses of these two contemporary Space exploration SF films. These films also reveal a possibility for us to reconnect with the earth as ground instead of Earth as the object.

To all the brave hearts

and all those who lost their life exploring outer space: animals and humans

ACKNOWLEDGEMENTS

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Introduction

Space[1], in its cosmological sense, mesmerizes people particularly. It is regarded as either some sort of extension of our everyday spaces—my bedroom, my apartment building, the backyard, the street, the grocery store, schools, and office buildings—or as something entirely different, something that has little to do with the everyday use of the term. Despite the scientific knowledge we now possess about the cosmos, people still subconsciously subscribe to the notion that cosmic space is very different from "ours."[2] The image of Space, or "outer space" as we are more inclined to call it, has changed enormously in the last century and it is still constantly being revised today. What I will argue in this thesis is that scientific footage and contemporary Space exploration films in the science fiction[3] genre are blurring the boundary between outer space and the everyday perceptual space.

I grew up in a time when China's astro-technology experienced rapid maturation. The first Shenzhou spacecraft was launched (1999)[4] one year later after the first component of the International Space Station (ISS) was in place[5]; back then I was in elementary school. As soon as I entered middle school, Yang Liwei became China's first astronaut to be sent up above the "sky" (2003) but that same year saw the horrifying disaster of the U.S. Space shuttle *Columbia*[6]. With Tiangong-2, the experimental space laboratory, joining the ISS in orbit in 2016,[7] the picture of Space has now very much changed from what it looked like in the mid-twentieth century, and is almost entirely different from how it was depicted in the early 1900s. At the same time, the film industry seems to have developed a taste for Space exploration in accordance to the normalized human activities in Space. Such films include: NASA IMAX documentaries such as *Space*

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[1] I will keep the capitalized "S" when the word Space is used to indicate the cosmic outer space or universe, while keeping the general orthography for all other uses.
[2] As I proceed, we will see that this headstrong tendency is not ungrounded, but rather profoundly rooted.
[3] "Science fiction" will be used interchangeably in my thesis with its abbreviated form "SF". Note that SF stands solely for science fiction in this thesis and does not have any other indications, namely "speculative fiction."
[4] See the news page from the CCTV website. http://news.cntv.cn/special/tiangong/shenzhouhuimou/01/index.shtml.
[5] See the International Space Station site by NASA.
[6] See Howell.
[7] See Reis.

Station 3D (2002) and *Hubble* (2010); cinematic reenactments of real events in Space such as *Apollo 13* (1995), *Гагарин. Первый в космосе* (*Gagarin: First in Space*) (2013), *Время первых* (*The Age of Pioneers*) (2017), *Салют 7* (*Salyut 7*) (2017), and *First Men* (2018); as well as science fiction films of potential Space exploration such as *Contact* (1997), *Deep Impact* (1998), *Mission to Mars* (2000), *Gravity* (2013), *Interstellar* (2014), *The Martian* (2015), and *Passengers* (2016), to name but a few.

In this thesis, I will look at images of Earth and Space in science fiction films that belong to a subgenre of Space exploration and at non-fictional footage of scientific exploration in order to investigate their mutual influences: how imaginary depictions have brought about changes to our conception and imagining of Earth and Space, and how non-fictional and scientific footage sets up the conventions for what is understood as "real" in images of astronautic explorations, which equally impacts the making of contemporary Space SF films. I will further examine these interactions and interfusions[8] against current discussions on Space, our position in it, and the Anthropocene.

Literature Review and Three interventions

This project is intended to intervene into three areas of study: science fiction genre studies, film phenomenology, and theories of "world" in literary and media studies. I wish to show that the framework of "world" can be crucial to the first two disciplines and that an investigation into Space exploration SF can benefit all three fields respectively: it offers a borderline case for SF studies, a renewed attention on "horizon" and "world" for film phenomenology, and an affective and pre-cognitive aspect for the formal studies of (represented) imaginary worlds.

1. Cinematic Science Fiction and Space Exploration

As most scholars who work on genre films have already stressed over and over again, any general treatment of a genre risks homogenizing what amounts to a diverse and variegated corpus. Genres, as Mark Bould notes, are "discursive phenomena, constantly defined and

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[8] By "interfusion," I mean the action of state of mixing two different matters together.

redefined by a host of different voices, with different degrees of influence, for many different reasons" (1), however, he adds that, "genres are [at the same time] frequently regarded as clearly defined objects, as boxes into which individual texts can be smoothly slotted" (1). The apparent paradox between the manifold texts and a unified category calls for a distinction between two kinds of discourses: the study of specific generic texts and meta-theoretical reflections on genre studies as a whole. The former deals with the diversity of texts and looks at the ways they manifest a particular genre, while the latter inquires into what makes such a study possible in the first place if a genre cannot be clearly defined.

Attempts to define science fiction have been made by many scholars, most famous among which are Darko Suvin's definition of the genre in literature as a "cognitive estrangement" ("On the Poetics" 372) and Susan Sontag's conception of the SF film as a fantastic way to cope with the "unremitting banality" and "inconceivable terror" of modern life (42). Vivian Sobchack in her *Screening Space* also offers an insightful definition of SF cinema as a genre that "emphasizes actual, extrapolative, or speculative science and the empirical method, interacting in a social context with the lesser emphasized, but still present, transcendentalism of magic and religion, in an attempt to reconcile man with the unknown" (64). Other scholars have typically chosen the thematic expression of utopia/dystopia as an entry point to the genre; for instance, Fredric Jameson understands the world created in SF to bear a deep resemblance to our own while from a particular starting point in the "future," he also takes it as a fundamental feature of SF to deliberately deviate from the literary "reality principle" (xiii-xiv). Nevertheless, he does agree with Suvin on the fact that "utopia is not a genre but the *socio-political subgenre of science fiction*" (*Metamorphosis* 61).

The issue of world is prominent in SF films, for this particular genre, as many scholars have noticed, often downplays the storytelling in favor of "displays". It has a way of exhibiting "its own distinctive matters of expression" and of attending to the "sensuous immediacy of the viewing experience" (Kuhn 5). Cinema gives us something concrete and tactile relative to SF worlds, which the other traditional media, like literature cannot accomplish. Whereas science

fiction worlds have received abundant attention, one particular subgenre is somehow left out, perhaps because of the almost invisible distance between the worlds created by these films and our own perceptual world. This subgenre is precisely the Space exploration SF film.

Seeking a definition of this subgenre within the generic bounds of SF, I cling to Suvin's conception of it as a genre "whose necessary and sufficient conditions are the presence and interaction of estrangement and cognition, and whose main formal device is an imaginative framework alternative to the author's empirical environment" ("On the Poetics" 375). This is because all the films that make up this subgenre have to be SF films in the first place and they should be neither truly scientific nor purely fantastical—that is, without any reference to real science. In addition to that, I also draw on Rick Altman, who, in his famous 1984 essay on genre, proposed a method that synthesizes the syntactic and the semantic approach. This somewhat structuralist methodology understands the nature of film genre as consisting of the selection of content (i.e., iconicity, settings, stereotypical events) and the ordering and structuring of that content (the syntagmas that produce relatively stable meaning). In a similar fashion, my project attempts to identify the Space exploration SF as a specific subgenre within the cinematic SF genre.

As will be shown in Chapters one and two, this particular subgenre involves the semantic content of 1) a serious treatment of science and scientific activities, 2) a series of iconic images of vehicles, satellites, and stations in Space activities as well as that of planets, stars and other celestial bodies popularized by mass media, and 3) embodied space constructed according to available astrophysical knowledge and theories. Syntactically, as well as affectively speaking, this subgenre also entails 4) sets of syntagmas that organize images in certain orders which have been conventionalized by television broadcasts of Space exploration (such as the countdown, the ignition, the close-up from the service structure, and tracking shots by the telescopic tracking systems, etc.), and 5) stylistic devices that help achieve an immersive experience for spectators (i.e., camera movements, lighting, *mise-en-scene*, and sound design).

In addition to my personal enthusiasm, I choose to focus on this particular subgenre because

of the ways recent Space exploration SF cinema has maximized the sensory experience of its fictional worlds by blurring the boundary between non-fictional scientific footage and fictional images. Such blurred boundary indicates an interfusion of ontologically different worlds, the scientific world (and its knowledge and theories), the video-mediated scientific world (via televised broadcasts), and the fictional (or imaginary) world (in SF movies). If the fundamental feature of the SF genre is that it must rely on a deviation from reality/real science, this very trend of Space exploration SF seems to have pushed the basic idea to its limit by coming very close to breaking its generic confines. However, I argue that the actual films that belong to this subgenre do not depart from the basic principles of SF (cinema); they are by nature fictional yet at the same time are imaginatively pushing the limit further for potential Space explorations. On the one hand, they are thought experiments based on speculations about the unknown universe and a possible prediction about future astronautic events; on the other hand, these thought experiments still have to be embodied in sound and image through technical experiments in cinematic form. In these experiments, world-experience and world-representation are taken up as core elements that determine the success of these films. Thus, my project can potentially bring an in-depth examination of this subgenre and in the process show how a perspective of world is necessary for understanding the interaction between the SF genre and real scientific activities.

2. Making Husserl Present in Film Phenomenology

Ever since Vivian Sobchack's *The Address of the Eye* (1992) and *Carnal Thoughts* (2004), the discipline of film studies has witnessed an outburst of works on film phenomenology: monographs such as those by Laura Marks—*The Skin of the Film* (2000), *Touch* (2002), and *Enfoldment and Infinity* (2010)—Malin Wahlberg's *Documentary Time* (2008), Jennifer Barker's *The Tactile Eye* (2009) and a forthcoming book of hers on synaesthesia in film experience, Julian Hanich's *Cinematic Emotion in Horror Films and Thrillers* (2010) and *The Audience Effect* (2018) originally published in German in 2012, Jennifer Chamarette's *Phenomenology and the Future of Film* (2012), Daniel Yacavone's *Film Worlds* (2015), Lee Carruthers' *Doing Time* (2016), Saige Walton's *Cinema's Baroque Flesh* (2016), and Scott Richmond's *Cinema's Bodily*

Illusions (2016); articles on film phenomenology have been constantly published by *New Review of Film and Television Studies* and *Film-Philosophy*, a special issue on the synaesthetic turn appeared on *New Review of Film and Television Studies* (2009), and *Studia Phænomenologica* recently also published a special issue on film phenomenology (2016).

Given the increasing numbers of articles, books, and special issues dedicated specifically to this approach, one would easily come to a conclusion that we are witnessing a renaissance of phenomenology in film studies. But I feel less certain about this especially when I look into how most of these studies bring phenomenology back to the discipline. It is prominent that the phenomenology of Maurice Merleau-Ponty has enjoyed an almost exclusive place in most of today's film phenomenological studies with a particular focus on his contributions to the issue of the body. Other philosophers belonging to this tradition are rarely discussed. It is true that Merleau-Ponty is one of the few phenomenologists to have directly engaged with cinema, especially in his 1945 lecture "Film and the New Psychology" where he argues that "the philosopher and the moviemaker share a certain way of being, a certain view of the world which belongs to a generation. It offers us yet another chance to confirm that [...] 'What is inside is also outside'" (59), but it in no ways makes him the only possible source for inspiration in this area. The current predominance of Merleau-Ponty in film phenomenology is probably also a result of two other factors: the rather negative reception of Allan Casebier's 1991 book on film phenomenology that draws almost solely on Husserl and Vivian Sobchack's explicit antagonism against Husserl in her extremely influential 1992 book *The Address of the Eye*. In that book, Sobchack speaks of Husserl's project as "*completely* antithetical to those of contemporary cinema studies" due to his proposal of a "transcendental ego" (xiv; my emphasis).[9] She justifies her preference for Merleau-Ponty over the other on an absolute distinction between an "existential phenomenology" and a "transcendental" one (xv; 26). It is on the one hand rather dubious whether such a distinction really exist (since such a different version of phenomenology

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[9] On the same page, she is equally critical of phenomenology's involvement with French Catholicism, which is, if viewed against Bazin's deep fascination with the world, a very problematic judgment to make. A similar argument against Husserl can be found in Hanich, *Cinematic Emotion* 40.

is never pronounced by Merleau-Ponty himself and the ongoing publication of Husserl's research manuscripts as well as lecture notes[10] demonstrate the great amount of attention he spent on the body, the world and other existential issues), and on the other hand Sobchack is somewhat headstrong in assuming the devastated fate of the latter project (for Merleau-Ponty never truly abandoned the transcendental project started by Husserl despite their disagreement on some of the methods this project should take). Interestingly, little has been said within film studies on the late Merleau-Ponty whose work is very different from that in *Phenomenology of Perception*, and who constantly comes back to Husserl and Heidegger[11]. As a result, there is a tendency in current film phenomenology to reduce philosophical phenomenology (which addresses the global problems of meaning and sense) to a regional study of the embodied conscious experience.

While Merleau-Ponty is indispensable for a film phenomenology, the wide range of topics addressed by Husserl's phenomenology is equally inspiring and can help spur even more fruitful investigations due to the latter's rigorous methods in reflection and description. Husserl's in-depth explorations of the structure of intentionality, inner time-consciousness, the structure of phantasy, image-consciousness and memory, the importance of the lived body and operative (*fundierende*) intentionality, horizon and Lifeworld (*Lebenswelt*) as the conscious background, and the sedimentationality of history and tradition offer highly pertinent insights into the affective and cognitive workings of cinematic sense-making. In addition to a similar focus on the studies of conscious experience, Husserl's major contribution is his largely unfinished project to establish a transcendental phenomenology, a philosophy that is "interested in an investigation of

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[10] See in particular, Husserl's *Experience and Judgment* (1939), *Ideas II* (1952), *Analyses Concerning Passive and Active Synthesis* (1966), *Thing and Space* (1973), and *Formal and Transcendental Logic* (1974) for Husserl's account of the body.

[11] Merleau-Ponty's understanding of a more complicated Husserl can be seen clearly in the posthumously published notes of his lectures delivered at the Collège de France, especially the one published under the title of *Husserl at the Limits of Phenomenology*. I have to note that Sobchack forms her central idea about the film body being at once the expressing expression and the expressed expression on the basis of Merleau-Ponty's later notion of "chiasm" without recognizing that this very idea is deeply rooted in Husserl's later works, especially "Origin of Geometry," which is collected in his *Crisis*. See Lawlor for an explication of Husserl and Heidegger's influence on later Merleau-Ponty. In that short essay, Lawlor notices that "in order not to fall into irrationalism, Merleau-Ponty always remains close to the Husserlian concept of transcendental intersubjectivity" (158-59). In recent film phenomenological studies, Scott Richmond has explicitly touched on such a "return" to Husserl via Renaud Barbaras' works (15). His book is one of the few exceptions that focus on late Merleau-Ponty.

consciousness in so far as consciousness is taken to be a condition of possibility for meaning, truth, validity, and appearance" (Zahavi, "Project of Naturalization" 339). Nonetheless, this project is by no means *essentialist* as people have accused it of being (Sobchack, *Address* xiv, 29; Hanich, *Cinematic Emotion* 40). It stands instead as a necessary methodology for investigating the source of meaning and sense without taking for granted metaphysical assumptions, namely those that would concern a pre-existing world independent of consciousness. The transcendental ego is not a static goal, or an essence, in itself to be discovered but a constantly developing and changing structure that enables and empowers our rigorous investigations. As Husserl himself has said, the transcendental ego (or subjectivity) is by nature transcendental *intersubjectivity* (*Cartesian* 30, 136).[12] The transcendental project goes much beyond a proposal of the transcendental ego, which the later Husserl tends to speak less of; it is an inquiry that "also includes the world itself, with all its true being" (Husserl, *Erste* 432; Zahavi, *Phenomenology* 46). The purpose of such a project is more "to liberate us from a natural(istic) dogmatism and to make us aware of our own constitutive (that is, cognitive, meaning-giving) contribution" than to locate an eternal *essence* (Zahavi, *Phenomenology* 46). Furthermore, Husserl tends to do much more than describe phenomenal content—that is, he offers more than a simple phenomenological psychology—and aims instead at both the fundamental sources of intersubjective meaning and the shared horizons of value, culture, and tradition.[13]

My thesis is intended to serve partly as a gesture toward a film phenomenology that draws more on the foundational analyses and investigations by Husserl (and other philosophers, namely Heidegger and Sartre) by incorporating both his methods and findings into the established realm of film phenomenology. I wish to address the specific issue of Space exploration in cinematic SF with a phenomenological attitude that is both transcendental and existentialist, and by doing so demonstrate a more colorful and variegated aspect of phenomenology. Husserl's later endeavors in perfecting a transcendental approach will hopefully be accepted without biases set up by an

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[12] In a sense, Husserl's transcendental subjectivity is definitely different from the Kantian subject as "an abstract, ideal, general, or transpersonal subject" (Zahavi, *Phenomenology* 48).

[13] See also Zahavi's most recent book (Zahavi, *Legacy*), especially the third and fourth chapters.

almost absurd, if fashionable, antagonism against the word "transcendental" and will contribute to the discussions happening at once within film studies and phenomenological aesthetics.

The journey with Husserl I am proposing here starts with his concepts of "horizon" and "Lifeworld" (*Lebenswelt*), which open the ground for later investigations of "worldliness" (*Weltlichkeit*) by Heidegger and the "expressed/sensible world" by Merleau-Ponty. My thesis aims to elaborate and develop these reflections on "world" in terms of film experience so as to supplement the already established theories of the "imaginary world" or "storyworld." Most previous studies on the imaginary world are carried out within contemporary narratology and media/game studies where the focus falls almost entirely on the representational aspect, leaving the affective-phenomenological world-experience seldom addressed. Some preliminary work has been done in Daniel Yacavone's *Film Worlds*, where he sets up the basic framework for a philosophical inquiry of the film world as consisting of three major phases: the cognitive-symbolic aspect of the represented world (based on Nelson Goodman's analytical methods), the affective-phenomenological aspect of the expressed world (based on Mikel Dufrenne's phenomenological aesthetics), and the historical and transsubjective aspect of the hermeneutic world (based on the work of Hans-Georg Gadamer). My thesis engages in particular the latter two phases of film worlds within a generic framework (that of SF). In this project, I wish to complement, and in some aspects even challenge, Yacavone's contribution.

3. World-Representation and World-Experience

A question immediately arises if one is to study cinematic SF from a phenomenological perspective: how is Science Fiction, a typically *speculative* genre, felt as concrete? Or, how is such a genre that is partly fantastical, yet partly requiring a deep sense of reality, actualized in the medium of cinema? The question urges us to investigate the relation between a SF world and our own perceptual world (usually referred to as "reality").

Narrative theories have offered plentiful explanations about our comprehension of a represented (story)world. Classical narratologists, for example, regard the concept of "diegesis" as a synonym to "storyworld" as the represented content of a narrative. Similar conceptions of

artistic worlds can also be found in logical (truth-conditional) semantics, where scholars conceive of referents as either "factual" or "objectless," and understand the artistic worlds as combinations of the two, so long as the worlds are taken to be existent (Yacavone 4-5). Under the influence of media studies in the past few decades (such as Henry Jenkins' *Convergence Culture* and Klastrup and Tosca's conception of "transmedial worlds"), contemporary narrative scholars have tended to move away from the narrative sense of the term to conceptualize the storyworld as fundamentally transmedial. Recent in-depth studies of storyworlds can be found in monographs by Marie-Laure Ryan (2006), David Herman (2009), Ciccoricco (2015), Thoss (2015), and Jan-Noël Thon (2016). Thon also edited a special issue of *Storyworlds* in 2015 on the concept of transmedial storyworld after co-editing with Marie-Laure Ryan an anthology *Storyworlds across Media* one year before.

From a broader perspective, Mark J.P. Wolf's conception of "world" has made a significant contribution to this shift of focus. His work on imaginary worlds and world building has offered both historical and formal accounts of how such practices come into being and develop, what elements usually constitute an imaginary world, how worlds are (sub)created within other worlds, and who exactly creates a world. Although more inclusive and expansive than most narratologists' conception of the term, Wolf also delineates the fundamental picture of world as a representation, a (imaginary) reality experienced by characters, created by artists, and represented through artistic articulations. This notion of world, following J.R.R. Tolkien's idea of "subcreation", serves as a starting point for our inquiry but at the same time a point that we need to overtake. Wolf and other scholars tend to stick to the conception of world as, for instance, "abstract content systems" (Klastrup and Tosca). The dichotomy between diegesis and form, though necessary in our conception of narrative, faces serious challenges (Yacavone 22-23). In order to bring it to the current study of film world, the presupposition of a "primary world" of reality and the imaginary world's independence from it also needs careful examination.

Thorough and scrupulous though they may be, these studies have little to say about the affective and hermeneutical aspects of world-experience (*Welterfahrung*). It is true that we can

directly grasp, or intuit such formal structures of the imaginary world when viewing a film; nonetheless, it is unclear how we come to see them and how the imaginary is given to us within, and in relation to, our perceptual world. Imaginary worlds in the current literature are considered primarily in their form of representation—as world-representation (*Weltvorstellung*).[14] When we say that the world of the *Star Wars* series is a universe that is "far far away" and "in a time long long ago," we are speaking of it metaphysically, as if it were independent of our experience of it.

From a perspective of film phenomenology and film-philosophy, Daniel Yacavone's *Film Worlds* offers a synthesis of symbolic and aesthetic accounts of the cinematic experience of worlds. As mentioned above, in order to arrive at a comprehensive symbolic-aesthetic theory, he draws on a variety of philosophical schools to address three rather distinctive aspects of film worlds: the symbolic, the affective, and the interpretive, which are considered as providing experiences that are at once "cognitive *and* immersive *and* sensuous" (xiv). Despite its great intervention to the issue of world and its effort of bringing these studies together under the banner of "film world," internal conflicts and contradictions are still somewhat prominent. I contend that such conflicts may have resulted from the over-ambitious goal of Yacavone's synthetic work, for it is an extremely difficult task to integrate such fundamentally dissimilar strands of thinking. One cannot address so distinctive subjects as world-experience and world-representation without a unified methodological standpoint that ties the symbolic, the affective, and the interpretive together.

The creation and reception of artworks are deeply intertwined with our ordinary perceptual experiences. World-experience in cinema has to be situated within a broader discussion of "world-horizon" in general. In contrast to Yacavone, Dudley Andrew, in *Concepts in Film Theory*, offers a more nuanced and complicated conception of world as composed of comprehensive systems that "comprise all elements that fit together within the same horizon, including elements that are in the foreground of experience, and those which sit vaguely on the horizon forming a background" (38). Moreover, Andrew also brings into the picture the

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[14] See Walton, "World-Experience" for a detailed explication. More discussions on these will be provided in Chapter one.

complexity of spectators' own *Lifeworld* experience, recognizing the viewer's role in world building. I find Andrew's conception of world to be closely related to the foundational understandings set out by Husserl and shared by other major phenomenologists. Husserl studies the structure of consciousness and its fundamental role in world-constitution, which in turn has much to offer to our investigations of film worlds. The experience of cinema should not be treated separately from but as participatory and contributory parts in our ordinary *Lifeworld* (or world in short).

World is first of all a world as horizon. In our ordinary perceptions, when we see a cube, it never appears to us with all its six sides at once. But somehow, we grasp it as a cube that possesses these aspects. The reason for this lies in our ability to make the unavailable aspects co-present with what is directly given in our vision. Husserl calls such a mode of consciousness "horizontal intentionality" (*Crisis* 161) and the unavailable aspects of a cube are conceived as "appresented" with the help of our horizon (*Ideas* 174-75). The situation is slightly different in our film experience. In his early magnum opus *Logical Investigations* (*Logische Untersuchungen*), Husserl dedicates the entire third investigation to a mereology, the theory of the relation between parts and wholes. When I see a table, what is given is not only an object table, but also the elements that comprise it, namely the legs and the surface. A conclusion can be derived from it that the table cannot be given without the purport of those constitutive material elements. The object table is in a relation of "necessary implication" to the material legs and surface, so we can say that the table is, as defined by Husserl, *founded* (*fundiert*) by those material elements (*Logical* 25-6). However, our perception of the table does not necessarily rely on our perception of those constitutive parts. The object table is not a synthetic result from our cognitive act of adding those parts together. Rather, the table is directly given to us, and we directly and intuitively grasp it as a table. This relation of *foundation* (*Fundierung*) is crucial to understanding the structure of image-consciousness (*Bildbewusstsein*), a mode of consciousness different from but not entirely exclusive of perception.[15] In an image-consciousness, Husserl

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[15] Husserl's conception of image-consciousness differs from the one Sartre develops in *The Imaginary* (*L'Imaginaire*) where the latter regards imaging consciousness (*conscience imageante*) as fundamentally distinct

distinguishes the image-thing (the image in its materiality) from the image-object (the object we identify in the image) and the image-subject (the thing that this object stands for or refers to) (*Phantasy* 20-1). Their relations are described as that of *foundation* (*Fundierung*). The image-subject is founded by the image-object that in turn is given foundation by the image-thing (43). But due to our ability to apprehend the object directly and intuitively without going into detailed examinations of its constitutive parts, the image-consciousness usually creates a paradox.

> The image object as image object must be the bearer of conflict in a *double sense*. In one sense (a), it is in conflict with the actual perceptual present. This is the conflict between the image as image-object appearance and the image as physical image thing; (b) in the other sense, there is the conflict between the image-object appearance and the presentation of the subject entwined with it or, rather, partially coinciding with it. (Husserl, *Phantasy* 55; my emphasis)

Therefore when seeing a cube in a film, we encounter the paradox, namely a conflict between two objects within the same intentionality: on the one hand, we wish to apprehend it as a cube with a solid body by supplementing it with the unavailable aspects in our horizon about the cube. It is given in a fashion that approximates how a cube appears in perception. On the other hand, the cube is intended as merely patterns of light and shade projected onto the screen, which does not have other aspects or dimensions. Both intentionalities involve appresentation of the horizontal content: the former calls for a horizon for a cube in perceptual space. The unavailable aspects are co-present because our experience with cubes offers the potentiality of such aspects that awaits our discovery if we move around the cube.[16] The latter intentionality focuses on the constitutive materials; the cube is withheld and gives way to the light, the shade, and the screen. The horizon supplies us with the flatness of the screen and the intangibility of the light, hence reminding us of the emptiness behind the object. Taken together, they make the image-consciousness that intends the cube as an image-object that is at the same time *founded*

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from perception.

[16] This experience is fundamentally kinaesthetic, and because my kinaesthetic knowledge of a cube is in the form of know-how (or *savoir-faire*) and only implicitly given to my conscious mind, the horizon is not explicitly known as a linguistic knowledge. See John J. Drummond for an explication of kinaesthesis' role in visual perception, based on Husserl's lecture notes published in *Thing and Space*.

(*fundiert*) by the material of light and shade: the image-thing.

Note that the difference between the two modes of film intentionality is not at all fundamental, but rather depends on the horizons we supplement with what is presented. The horizon for the cube intended as image-object creates the space around the cube along with its six aspects, hence supplying the object with a *quasi*-perceptual world as if it were a real embodied cube in our perceptual world. It is only when we subordinate this world to the perceptual world—one given along with the horizon for the image-thing, the light, the shade, and the screen—that we tend to dismiss the former world-horizon as merely imaginary. Materialist film theories have tried to disparage such a world-horizon of the image-object as nothing but an illusion. The goal of such projects is to lay bare cinema's nature as an illusion-making apparatus. But the theoris overlook the fact that what spectators typically see in most fiction films are the objects *in* the film, not the material *of* the film projection, even if the former must be *founded* by the latter.[17]

My thesis is going to explore the interactions and interfusions among these different levels of world-horizons: how the horizon of an imaginary world can greatly impact and even change the perceptual world, how the perceptual world expands its horizon via audiovisual means (by taking the form of image), and how fictional films employ such an expanded horizon to directly engage problems in our perceptual world. These inquiries will be carried out by examining the cinematic subgenre of Space exploration SF, since these films offer great examples of interfusion and mutual influence between horizons in the history of film and that of real scientific developments. The project will equally shed light on current events happening in actual Space programs and their horizontal background of the Anthropocene, from a perspective offered by Husserlian phenomenology: its insight on world-horizon, the *earthground* (*Erdboden*), and a Heideggerian critique of the world-picture (*Weldbild*) developed out of his teacher's legacy.

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[17] A similar argument has been developed by Roman Jakobson to pin down the relation between a formal study of *la langue* (the language system) and an empirical study of *langage* (the languages in use). The former is founded by the latter but can be independently studied (525). But of course, things can be more complicated when the film image is foregrounded because of its grain or other material qualities (think of Jean-Luc Godard for instance). In these occasions, the image-thing also manifests itself.

Methodology and Chapter Synopses

This thesis is conducted in part as a philosophical (phenomenological and semiotic) inquiry into the problem of "world," or world-horizon. It is an aesthetic study of the (synthetic) semiotico-aesthetic nature of film worlds and their relations with the perceptual world. The project seeks to arrive at a theory that is capable of accounting for our world-experience on both local and global levels without a presupposition of pre-given worlds or a dichotomized and hierarchical framework. To do so, I make use of both film texts that belong to Space exploration SF and non-fictional audiovisual footage of scientific activities. I try to bring aesthetic texts in dialogue with historical events, hence involving historical research that does not usually take up great portions of theoretical writings in film studies. Backstories of SF films as well as that of the Space Race and the later Space programs are examined as horizons that make the texts meaningful. Additionally, textual analyses (both formal and thematic) are fundamental to this project, for they afford the very possibility of thinking through such problems. As an essential part, textual analyses both render the issue of world prominent and better situate philosophical discussions with/in a particular screen culture (the SF genre) as well as its historical interplay with cinematic and scientific technologies.

Starting with an inquiry of the genealogy of a particular subgenre of science fiction films that centers on the topic of Space exploration, Chapter one will delve into the history of science fiction films and its subgenre of Space exploration. I will argue that Georges Méliès' *Le Voyage dans la lune* (1902) starts both this subgenre as well as a speculative tradition of world building specific to it, through an analysis of the film's treatment of the theme of Moon landing and by its stylistic choices. This tradition later continues in other films that belong to the subgenre but gradually fades from film screens as astrophysical science becomes more available and more widely accepted by the general public. The change of general conceptions about Space corresponds to a change in (or expansion of) our horizons, which has undergone a long process. However, I argue that such a horizon shift does not only result from the proliferation of scientific knowledge but also, and perhaps more significantly, results from the influences of popular media,

such as science fiction films. Fritz Lang's *Frau im Mond* (*Women in the Moon*) (1929) is taken as the primal text that sets up an embodied tradition in the subgenre as an alternative to the speculative approach initiated by Méliès. This embodied tradition then becomes one of the most important factors in our horizon's expansion. Along with *Destination Moon* (1950), another exemplary Space exploration SF film, the chapter attempts to show that they contributed not only to a conceptual shift regarding Space in the general public but also to the real development of modern rocketry and Space programs in the scientific sector.

The second chapter begins with how modern Space programs gained public attention with the help of the recently available technologies of live television broadcasting. The syntagmas and the visual codes of such televisual footage bears strong resemblance to the embodied SF films I have mentioned above, but somehow these images have established themselves as the standard reality for scientific and astronautic activities. The rest of the chapter argues how contemporary (21th century) SF films on Space exploration make use of such conventional syntagmas and visual codes and how they push these conventions further by employing new filmmaking equipment and digital imaging technology. I then go on to examine in depth *Gravity* (2010) and *Interstellar* (2014) as two prominent cases of contemporary Space SF, and I break down their formal constructions and special effects so as to lay bare the specific ways these films immerse the spectators into an aesthetic (and kinaesthetic) world-horizon.

Chapter three demonstrates how such immersive experience embodies very different themes in *Gravity* and *Interstellar*. Drawing on Heidegger and Husserl, I will show how these two films engage with the issues of world-picture (*Weltbild*) and earth-ground (*Erdboden*) in distinct ways. The difference between the content and expressions of the two films leads further to their different attitudes toward the future of human beings, the home planet, and interstellar colonization. I identify among them two major issues: whether we should leave the Earth or save it and whether we should focus on colonizing other planets or exploring the universe. The former choices of each pair are highly visible in contemporary Space programs and films, and they follow an ideological lineage that can be traced all the way back to some metaphysical premises.

Particular in such a tradition is the Nazi rocket industry and its direct legacy inherited by the postwar Space Race, later Space programs, and the science fiction film genre. I will explore in what ways such an ideological legacy is deeply intertwined with—and perhaps highly responsible for—the current crises of the Anthropocene.

Chapter 1. Speculative and Embodied:

Two Traditions in Space Exploration Science Fiction Cinema

> Because fictions do not refer in a "reproductive" way to reality as already given, they may refer in a "productive" way to reality as intimated by the fiction. [...] Because it has no previous referent, it may refer in a productive way to reality, and even *increase* reality.
>
> —— Paul Ricœur, "The Function of Fiction in Shaping Reality" 126-27

At the turn of the twentieth century, humanity had not yet sent anything up above the earth's atmosphere. To put it in a different way, Space was in practice outside of human territory. Comparable to the Antarctic continent before 1895, outer space was not yet a place that humans had set foot on.[1] One major difference however was that paying a visit to the Antarctic was only a matter of time while going up to outer space called for an evolution in technology. While captain James Cook was purportedly only about 193 km (120 miles) away from Antarctica in 1773 (Herdman 534), the first visit to outer space was not made possible until a camera attached to a captured-and-modified V-2 rocket brought back moving images taken beyond the Earth's atmosphere (65 miles or 104.61 km above the ground) on October 24, 1946 (Daley).

However, in 1902, the world, or at least the Western world, witnessed the release of one of Georges Méliès' most loved films, *Le Voyage dans la lune* (*A Trip to the Moon*). The Jules Verne-inspired short film not only took spectators above the atmosphere but also had them witness a Moon-landing long before any of these feats had been accomplished in reality. The film was a tremendous success when released both in France and internationally (Solomon 3). After a period of obscurity, it was rediscovered around 1930 (3). With the recovery of another original hand-colored print in 2000 (8), the film was finally restored and celebrated as one of the 100 greatest films in history (*Village Voice*). *Le Voyage dans la lune* marks the beginning of the long and prosperous history of cinematic science fiction as well as that of the particular subgenre I call Space exploration SF cinema.

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[1] See Tuan, *Space and Place* for more on the distinction between space and place.

In this chapter, I will look into changes brought about by cinematic images upon our conception and imagining of Earth and Space on one hand and at the impacts these imaginary depictions have had on modern rocket technology and astronautic explorations, as well as our understanding of them on the other. I start with a genealogy of what I call the speculative tradition and the embodied tradition in Space SF films to show how the latter of the two departs from the former one. The chapter will examine how the embodied tradition, unlike the speculative one, has infiltrated the real perceptual world, how it has enabled imaginary worlds to expand our horizons about Space and astronautics in real life, and how early Space SF films, in particular, have contributed to real scientific developments and anticipated real astronautic events.

The Speculative Space and the Rise of Cinematic Space SF

Georges Méliès made several shorts that can properly be called science fiction, not only for their fantastic stories based on works by authors like Jules Verne,[2] but also because of their cinematic endeavors in bringing out those fantastic spaces in the concrete and sensible manner that the new medium of cinema made possible. *Le Voyage dans la lune* (1902) set the bar high for almost all science fiction films to follow. However, a brief comparison between Mélièsian SF and today's mainstream SF cinema will reveal sharp contrasts in both content and expression.[3]

Le Voyage dans la lune relates the story of a group of scholars from an astronomy academy who decide to go to the Moon[4]. They hire workers to build a spacecraft that can send them up there. Shortly, the bullet-like rocket ship is ready and the scholars depart on it as people fare them well and ignite the launch fuse. The ship is sent up to the Moon by a cannon. Soon, we see

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[2] According to Tom Gunning, Méliès' film follows the Moon landing plot in H.G. Wells' *The First Men in the Moon*, instead of Verne's (Gunning and Loew 569).

[3] In my thesis, I try to avoid the traditional content-form dichotomy by following the Danish linguist Louis Hjelmslev's more nuanced distinction between expression and content. Form is used to address the abstract structure behind the façades of particular films. For instance, the content-form may include the iconic elements for a specific genre and its conventional narrative (or syntax), while expression-form involves all kinds of expressive devices we can use in making such films. These forms can only be arrived at through their manifestations in particular films, that is, the substances of content and expression. See Hjelmslev for his explanation of these categories.

[4] Here, I am following the story of the rediscovered print found by Lobster Film in Spain in 2000.

the Moon, surrounded by clouds, looming large, its face becoming increasingly visible. The ship strikes directly into the right eye of the Moon's face, which turns it into a disgusted expression. This is followed by a scene on the Moon as the ship arrives crashing onto its surface and the scholars get off the ship without any equipment or specially made spacesuits. A strange landscape comprising of alien rocks and mounds surrounds them. Once all crew members get off the ship, the spacecraft simply vanishes into thin air. The scholars are then excited at seeing the Earth rising on the horizon. A series of fantastic occurrences soon ensue, such as sudden explosions from the ground, a sense of exhaustion that puts the Space travellers to sleep, a passing comet, the Big Dipper appearing with seven faces, and an encounter with gods and goddesses of the stars and planets who call for snow. The snow wakes up the scholars and they move underground where alien plants (most of which look like giant mushrooms) flourish. An umbrella is turned into a mushroom and continues to grow. An alien being suddenly appears on the scene and interrupts the wonder, but its friendly gestures are met by the scholars' aggressive responses. It disappears, or supposedly dies, after being hit by one of the astronauts. This aggressive gesture attracts more alien beings until all the scholars are taken to the palace of the alien king as prisoners. One of the scholars soon kills the king by smashing him unto the ground. As a result, the scholars have to run for their life and escape the pursuing alien soldiers. The space ship is retrieved (the film does not show how) and pulled off a cliff. By doing so, the ship and its crew fall back on earth dropping into the ocean. They are towed back home, celebrated by a welcoming crowd, and rewarded with giant Moon-faced medals. The scholars then present the gift brought back from the Moon: a captured Moon alien held by a rope around his neck and beaten with a stick. He is displayed in the parade in front of a statue honoring the leader of the scholars and his brave travel to the Moon.

As we can see, the story revolves around a journey that is not treated as a serious scientific exploration but almost as a parody of science and scientists. The scholars are portrayed in a fashion so disrespectful that they accomplish almost nothing except coming up with the empty idea of going to the Moon. While the workers build the ship the scholars visit and disrupt its

construction; the friendly aliens are met by the scholars' aggressive beatings; on the Moon, the scholars do nothing save fall asleep and run away from the pursuing aliens; the captured alien is treated and displayed in a manner not so much different from the way exotic slaves or aboriginal people were through during the colonial era. In all, the entire event of going to the Moon is depicted in the film as a sort of joke, though it is nonetheless celebrated by the inhabitants of the film world (Solomon 9-11). While the film is a showcase of Méliès' tricks and special effects, neither Space exploration (Moon-landing) nor Space is taken as objects of serious or scientific consideration. In this regard, it is possible to surmise that such a "light" treatment of the topic reflected the era's mainstream opinions toward Space and Space travel (i.e., as something scientifically "impossible" and therefore not wanting of serious consideration but best treated as fantasy) while at the same time deepening them.

The method and the vehicle used to carry the scholars to the Moon seem somewhat peculiar, if not absolutely imaginative, to a modern spectator. The cannon and the metal bullet-like spacecraft are far from how we conceive of Space travel today. As traces of the theatrical traditions are obvious in this film's world building, it is easy to concur that Méliès did not at all intend to convince the audience into believing in the reality (or the real feasibility) of a trip to the Moon or else to give them the impression of witnessing how such a trip would really look like. What drives the impression of reality here is less the images than the fictional narrative. When the travellers are escaping the pursuing aliens, their spacecraft simply drops off the edge of the Moon, and *voilà*! They are back home on Earth. This idea of going off the edge of Moon and falling back to Earth (from the sky) apparently contradicts the rising image of the round Earth the scholars see just moments after landing on the Moon. Thus, two rather opposing ideas about cosmos—the pre-scientific and the scientific—seem to have been both taken up by Méliès without any effort to reconcile them. Moreover, the displacement of the spacecraft from Earth to the Moon is only implied by showing the planet Earth as over-there (seen as an object in the background) instead of right-here (felt as the ground where the characters stand). Indeed, the two

locations are not represented as fundamentally different; rather, their difference must be inferred[5]. Spectators have to understand the event as taking place respectively on Earth and on the Moon according to information provided either from the storyworld through the drawings on the blackboard in the academy, from the conventional portrayal of the Moon, or from the title of the film. For a modern viewer of the film, there are non of the tell-tale signs that we are on the moon: reduced gravity, absence of oxygen, barren landscape, absence of the sky, etc.

With regards to its stylistic and expressive choices, Méliès' SF film can still be seen as a product of theatrical art, not only is the camera fixed, what is presented seems also to depart little from a drama played out on a proscenium stage. The performance is exaggerated so as to stimulate laughter; the costumes are flamboyant and unpractical, unfit for the activities depicted in the story. The movements and actions are generally carried out on a horizontal line parallel to the backdrop and for the most part of the film the orientation is limited to left and right (*côté jardin* and *côté cour*). As a result, depth of space is shallow with only a few exceptions where the actors stand in multiple lines and walk toward or away from the backdrop. That said, we can see attempts throughout the film to create a limited sense of depth. Several sets divide the shooting stage into layers or planes overlaying one another though they remain parallel to each other—a theatrical device but one that, in the context of cinema, reminds us of multi-planar cel animation. Also by using the principles of monocular perspective, actors and objects (be they painted or crafted) appear in the frame relative to their size as seen from the point of view of the camera lens so as to create a visual order where the objects closer to our viewpoint occupy a larger portion of the image than those represented as farther away. Several scenes offer prominent examples of this. In the preparatory sequence, the scholars exit the factory where the ship is being built and ascend a terrace overlooking the entire manufacturing complex which is supposed to show the industrial sector of the city. The actors are positioned at the right front

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[5] An equally prominent case can be found in the Danish SF film *Himmelskibet* (*A Trip to Mars*) (1918), where the appearance of Mars is almost identical to that of the Earth, the gravity, the air, and even the magnitudes of the Sun. Similarly, differences can be detected only through inferences and the intertitles. However, whereas Méliès' shorts are not really interested in the scientificity of Space travel, *Himmelskibet* pays a considerable amount of attention on how the scientists carry out such an expedition. Also, significantly, the Martians greet the expeditors with a globe of Earth, an image of the planet Earth indeed!

edge of the frame against the vast hand-painted background sets that cover the frame from its lower end all the way to the top. The multilayered sets are arranged to deliver a pictorial sense of depth: rooftops are seen at the lower end to indicate a point of view set on an equal level with the terrace and above most of the buildings in the region. In the middle part of the frame we can see layers of factory houses with chimneys that are painted in smaller sizes and in a paler shade to indicate the distance between them and the camera's viewpoint. The most interesting design is found in the upper portion of the frames. Méliès manages to show real smoke coming out of the factory chimneys by installing pipes in between the layers of painted backdrops, which adds a visual attraction as well as a sense of reality to the scene. To indicate the altitude of the launch ground, the scene that follows is constructed with at least four planes: the front layer consisting of rooftops that are supposed to be nearer to the camera (though they fail to give that impression), the platform where the scholars enter the capsule of the spacecraft, the platform that is higher and overlooks the spacecraft, and a backdrop layer that is painted with distant houses and the night sky. Similar techniques are used in later scenes on the Moon. When the scholars become excited at seeing Earth rising from the horizon, the distant plane lowers in tandem with the raised plane of Earth so as to simulate the greater altitude to which Earth has risen.

The style and expressive devices used are deliberately dramatic since, according to Méliès himself, the priority is given to the "stage effect," the "trick" or "a nicely arranged tableau" rather than the tale (118, Qtd. in Gunning, "The Cinema of Attraction" 64). The film's prominent "cinema of attraction" features, as Tom Gunning argues, foreground the possibilities of the cinematic medium, promote in an exhibitionist way the cinematic machine itself as a selling point, and even create an avant-gardist impact on the spectators (64-70). Such films aimed at evoking sensuous responses or even extreme emotional reactions; priority was given to the sensational aspect of the medium over incorporating events into the more established traditions of narrative fiction in art forms that are branded as bourgeois, namely novels, theater, et cetera. As a whole, *Le Voyage dans la lune* belongs instead to a tradition inherited from vaudeville shows and the circus. The film is not intended to offer a rigorous account of what a real scientific

exploration of Space would be like; nor is the filmmaker interested in creating a world-experience of Space travel and of the Moon in a strictly exploratory sense for the spectators. I call this kind of world building practice in Space SF cinema the *speculative* method because the emphasis has been put on the speculative content in the story instead of the expressive form that confers the world-experience. That is to be contrasted to what I call the *embodied* method, on which I shall elaborate in the following sections.

From 1907 to about 1913, the film industry changed rapidly from a tendency to "attract" and "amuse" to a preference for narrative. With the arrival of feature films, especially those by D.W. Griffith, developments in SF cinema also witnessed a trend to reorient the focus from attractive spectacles to narrative and (realistic) world building.

Taking up the classical cinematic forms of narrative recently developed in the United States and retaining a Mélièsian interest in the spectacular, *Aelita* (1924), directed by Yakov Protazanov, succeeded *Le Voyage dans la lune* and went further by combining it with socialist realism and constructivism. The film's crosscutting goes back and forth between the Soviet world (portrayed in realistic style) and the Martian world (depicted through constructivist settings). The two rather disparate worlds are then bridged when the protagonist-engineer Los (Nikolai Tsereteli) launches his rocket to reach Mars. Interestingly, the image of the round Earth once again plays the important role of indicating, or narrating in terms of its formal function, the change of space, although this time it is not rising from the horizon but moving away from the flying spaceship (the camera's point of view). The spectators, who assume the perspective of the sugar-profiteer (Pavel Pol), are told in this fashion that the characters are leaving the Earth on a spacecraft (or whatever vehicle that the film does not even explicitly show). Along with this, the extraordinary space on Mars, presented with highly expressionist and stylistic sets and costumes, appears to be more symbolic than realistic. Like some Soviet reviewers who understood the Martian world to be merely the protagonist's fantasy (Christensen 107-8), we are confused by the reality of such a planet and constantly referred back to the film's realistically set Soviet city.

In spite of disputes over the film's ideological message[6], the "Martian Union of Soviet Socialist Republics" seems to embody the Soviet revolutionary ideology. The constructivist Mars is but a symbolic allegory either for the pre-revolutionary bourgeois society, the post-revolutionary remnants of bourgeois culture, or else the fantasized realm of the protagonist-engineer.

Together with *Le Voyage dans la lune*, the speculative method shared by these two early classics of SF cinema clearly downplays the role of any scientific facts already available at the time with regards to Space or Space travel.[7] Instead, they focus on messages conveyed through a symbolic space. The sets of the Moon in *Le Voyage dans la lune* and that of Mars in *Aelita* are not supposed to present worlds of some remote realities but only to symbolically represent or designate *our own world*: a displaced reflection upon ourselves. They function in a similar way to theatrical sets. The plants of abnormally huge size on Méliès' Moon and the geometrically shaped architecture on Protazanov's Mars are not to be taken to represent what the Moon or Mars "really" look like, were it possible to travel there. Rocks on the Moon, for instance, would not be made of paper or wooden boards and they would not move in the manner that a plane of painted sets would. Even if cinematic images of such hand-drawn sets are materially identical to that of real photographed space, they nonetheless manifest rather different qualities since most handcrafted 2D settings were easily discernible prior to the digital age.[8] The crucial point here is that the shooting and performance of these films take place in a speculative space that requires the imaginative supplement on the part of the viewer. In this sense, they belong to an older tradition of space/world building as seen in theater.

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[6] Kristin Thompson has pointed out that Soviet films in the 1920s were indeed international films for their dependence on foreign trade and credit. By 1928, the IAH (Internationale Arbeitshilfe) almost took over their shares of the film firm Russ, which resulted in Mezhrabpom-Russ films (that produced *Aelita*) being aimed more at Western audiences than domestic ones (30). Christensen, following Thompson, argues that Bolshevik film critics at the time accused Mezhrabpom-Russ of "making films [...] deliberately for export to gain money from Western audiences" (109).

[7] Although such knowledge was not widely accepted and remained largely unknown by the general public, these films did not intend to bring it to their audiences. Scientificity was not something that concerned these filmmakers and this sets them apart from those of the embodied tradition to come.

[8] To be sure, some special effects might be more difficult to discern if they are meticulously done in combination with location shooting, such as the use of miniature models.

The Birth of the Embodied Tradition

Such an imaginative and highly expressive method of world building gradually declined as scientific studies with regards to Space and astronautics became more available and more widely accepted by the general public. But just as Gunning has noted, the preeminence of narrative in classical Hollywood cinema did not rule out, nor eradicate, certain aspects of the attraction mode of filmmaking. Attractive elements linger on and are for the most part synthesized with the narrative.[9] Scientific spectacles nonetheless came to replace purely fantastic ones; rigorous efforts in presenting potential experiences of "real" future Space explorations came to substitute the comic, parodic, or fantastic visual effects. Even if the speculative tradition of Méliès has remained a key element for SF and is still visible in contemporary films, as we can see in recent films such as Luc Besson's *Valerian and the City of a Thousands Planets* (2017) and Ari Folman's *The Congress* (2013), treating science seriously has become a standard way of doing things for the majority of SF films. In order to make a Space narrative believable, it now has to be compatible, or at least not incompatible, with available scientific knowledge because the latter has become an essential part of our worldly horizons since the proliferation of aviational technologies and modern physics.

In this sense, the shift identified by many film scholars as one from a cinema of *attraction* to a *narrative* cinema could also be seen as a shift from cinema as *spectacle* to cinema as *world*. The greatest change seems to lie in the immersiveness rather than the spectacularity or attractiveness of the film: whereas cinema as *spectacle* provokes context-poor sensational and emotional responses, and perhaps entails fragmentary points of curiosity, cinema as *world* situates the spectacles within the specific contexts of a storyworld and usually organizes the sequences of mere attractions into a consistent narrative. As I mentioned in the Introduction, it is necessary that characters and events, as image-objects, be presented not in isolation but within a horizon which provides the spectator with an immersive experience. An image-object without

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[9] There are prominent exceptions however. Certain genres such as musicals have kept attractive elements as somewhat extra-narrative components of the film.

horizon would not be recognized or identified as an object at all. An object presented is always and already an object appresented, that is, supplemented by certain horizons.[10] The change of cinematic styles implies a change of cinematic horizon, hence a change in the cinematic institution itself. What at one point was only intended to produce sporadic amusement for viewers has now become a greater apparatus that seems to attract their full immersive attention. Audiences wish for a world, for a more intense form of film experience, and such a world cannot but be built around our perceptual horizons.

This tradition of world building is reflected in Space SF through what I call the embodied method, whose origin can be traced back to Fritz Lang's 1929 *Frau im Mond* (*Women in the Moon*). Five years after the release of *Aelita*, this film—which is Fritz Lang's last silent feature—totally changed the experience of science fiction cinema. In a manner very different from the previous SF films, *Frau im Mond* celebrates (the spiritualization of) modern technology, especially modern rocketry. The film, notes Tom Gunning, "merges film text and historical context to such a degree that categories of science and fiction, technology and artistic design, blur" (Gunning and Loew 555). This insightful comment has to be understood on several levels: in terms of the film's thematic treatment of science and technology, its realistic manner of portraying Space and astronautic activities; and in terms of its ties with and its indisputable impact on modern rocketry (including the V-2 rocket of Nazi Germany) as well as future aeronautics. I will begin with the first two aspects and continue with the third in the next section.

First, the film's focus on the technological (or even the technical) details of Space travel as well as modern rocketry revolutionized the conception of the SF genre. Whereas the emphasis of the genre previously fell on the second word "fiction," Lang's film reversed the situation by bringing to the fore the first term "science". Such a thematic shift distinguishes it from previous cinematic renditions of SF in their choice of content. As we saw earlier, neither Méliès nor Protazanov showed much interest in the reality (or scientifically based depection) of the

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[10] Nowadays, it has become a standard that the production of a fantastic blockbuster usually involves the tedious and demanding work of world building. A trustworthy world is even more important than a plausible story or realistic performance (Wolf, "World Design" 67).

extraterrestrial world. Nor did they especially care how the astronauts manage to travel such great distances or cope with issues of astrophysics.

Space travel is particularly downplayed in both earlier films and what we see about the journey is limited to the crash-landing on the Moon of the bullet-shaped spaceship in *Le Voyage dans la lune* and the unnamed spaceship that is only shown rather briefly in *Aelita*, which lands on Mars also by crashing onto its surface. Little is explored or even imagined about the travel *per se*. In contrast, Lang demonstrated great enthusiasm in perfecting the minute details of the scientific design of the spacecraft, the boarding of the astronauts, the launch procedures (especially the well-known count-down sequence), effects of gravity on the crew, the landing, all the way to the lift-off on the Moon for the return trip. Lang chose a rocket design over the bullet cannon model of Méliès for the spaceship based on the then ongoing scientific experiments and trends in early Space travel research and discussions in Germany (Neufield). The famous *Verein für Raumschiffahrt* (or VfR, Society for Space Travel) of amateur rocket enthusiasts was formed in 1927 and followed the rocket-travel idea popularized by Hermann Oberth's book *Rakete zu den Planetenräumen* (*The Rocket into Planetary Space*) published in 1923 and expanded in 1929 as *Wege zur Raumschiffahrt* (*Ways to Spaceflight*).[11] The rocket in the film was designed by Oberth and his team (many of whom were members of VfR) and was featured in the promotion for the film. Although the scheduled launch of a model rocket was not realized due to various issues, the imagery we see in the film reflects what a real operational rocket would look like. The components of the rocket, which include a habitation module for the crew on top of the vehicle and the engines and nozzles in the lower part have become signature traits of real Space travel and still remain the same in today's rockets. The interior of the habitation module consists of two decks: the upper deck for the pilot and the lower deck for the other crew members, connected by a steel ladder. All of the crew are buckled up and fixed to their bunks for takeoff. The rocket launches partly immersed in water to reduce the shock, which is a technique still widely used for submarine ballistic missiles today. The launch is accompanied with a countdown to increase the

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[11] The 1929 book was dedicated to Thea von Harbou and Fritz Lang (Oberth v). Among the other members, some such as Willy Ley and Wernher von Braun later became associated with the U.S. Space programs.

tension and the subsequent situation of increasing G is enacted through both the barometers and the actors and actress' performance. Ahead of all other Space exploration films, Lang has even presented the zero-G situations of Space travel, where the characters have to slip their feet into straps attached to the ground of the habitation module to stay still or move. A sequence of shots shows the boy character Gustav (Gustl Gstettenbaur) moving from the lower deck to the upper one by setting himself free from the straps and floating upward. The shots are done in a concise and believable manner, especially when the boy hits the top of the module for not being able to stop his floating motion. Any details of wire are carefully hidden.

Figure 1.1 Screenshot from *Frau im Mond* (top left) ©Ufa, the first photograph of the Moon by J.W. Draper in 1840 (top right) ©Getty Images, and screenshot from NASA's Apollo 8 footage in 1968 (lower) ©NASA

The depiction of the Moon is yet another prominent feature where this film differs from

previous ones. Unlike the strange, yet life-flourishing, Moon represented in *Le Voyage dans la lune* and the highly expressive Martian palace in *Aelita*, the Moon in *Frau im Mond* is bleak and barren. The surface is first shown in the background when the rocket approaches and travels across the vast plains of the crater-filled landscape. It would be difficult to tell the difference between this image and what the Moon appears through a telescope.[12] The meticulously crafted model in close-ups comes very close to what the Moon actually looks like. It also serves as a depressing signal for the explorers who wish to find gold on the Moon. The rapidly passing scenery of the Moon surface through the rocket's windows resembles those we will see years later through the window of the Eagle from the Apollo 11 mission as the landing module searches for a spot to land (see Figure 1.1).

Other aspects of the Moon that are no longer scientifically accurate are nevertheless presented in the film as discoveries from careful scientific experiments. For instance, despite the film's mistaken conception of breathable air on the Moon, its presence is nonetheless first tested by the crazy scientist Georg Manfeldt (Klaus Pohl) by striking a match in the air. The much smaller gravity on the Moon is also taken into consideration; characters are dressed in shoes that have particularly thick (hence heavy) soles. The discovery of gold on the Moon in a subterranean cave, though purely fantastical, is sidelined as a metaphorical denunciation of insatiable capitalistic greed and misled scientific pride.

As indicated in the film's epigraph "'Never' does not exist for the human mind ... only 'Not yet'" ("*Es gibt für den menschlichen Geift kein Niemals, höchstens ein Noch nich*"), the film's technophilic quality straightforwardly rejects the satirical tone prominent in previous SF films.[13] Technology in *Frau im Mond* is not something that is ridiculed as a form of medieval magic;[14] nor is it the absolute accomplice of imperialism and capitalist greed. It is treated with respect. Thus, the film's attitude toward science and technology marks the first major departure from the

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[12] Retrospectively, we can even say that it resembles what we see in the photograph taken by the Soviet Luna-2 probe sent to the Moon in 1959.

[13] Matthew Solomon summarizes in the Introduction to an anthology on the film, the critical tendency to regard *Le Voyage dans la lune* as a satirical piece that points out clearly the problems of "Western imperial ambition" (12).

[14] It is intriguing that in Lang's *Metropolis*, technology is given an equally complex view, neither entirely good nor entirely bad despite the indicated deep connection it has to medieval magic.

speculative tradition.

Second, Lang's *Frau im Mond* signals a bifurcation in the practices of SF world building which are still with us today. The realistic manner Lang has taken to portray technology and extraterrestrial exploration rejects the mostly fantastical representations of alien space that had been popular and pervasive in previous SF films. Moreover, the possibility for Space travel in the film is not set in some inconceivable age to come. Rather, the story treats the available science seriously and envisages Space travel in an almost contemporary era (or, at most, a near future). In this way, scientific and technological knowledge about rocketry and Moon-landing is raised to an equal footing with artistic creations and imagination in the making of SF films. The film does not extrapolate an entirely distinct world from pure and fantastic speculations, but instead relies heavily on an extended and expanded horizon of our own world (circa 1929) made possible by new technologies and the newly available scientific knowledge.

Hence, *Frau im Mond* becomes perhaps the first film that falls under the rubric of the embodied method in representing Space travel on screen. As Husserl has noticed, world-experience [*Welterfahrung*] is prominently different from world-representation [*Weltvorstellung*].[15] What we encounter primarily in an artwork (be it literary, theatrical, painterly, or cinematic) is a world for experience, a world-horizon, a latent background for perception and understanding. Only in our reflection do we come up with a "picture" of the diegetic world—the world-representation. No representational world can exist without manifesting itself in a specific world-experience. Hence, even the same world-representation can take very different forms of experience. Different media and styles offer different world-experiences. The world experienced when reading a novel relies heavily on the readers' symbolic comprehension and imagination, while the world experienced when reading a comic book may be less symbolic but still involves the readers' imaginative supplementation. Watching a film offers greater immersive experience in a *quasi*-perceptual way but it also varies according to the style being used. The heavy uses of sets and theatrical performances foreground the

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[15] See an in-depth interpretation of Husserl's distinction among world-experience, world-representation and world-Idea in Walton, "World-experience".

materiality of the painterly sets and models since they are easily identified as different from the actually embodied perceptual objects. The discrepancy between a photograph of the real city and a painting of the city can be prominent if efforts are not taken by the set designers to produce photorealistic effects. What I call the speculative method therefore makes the film space and objects less spontaneous and less felt as present for spectators.

SF films prior to *Frau im Mond* rely heavily on spectators' comprehension of their world-representation—what a certain set means or refers to, what certain actors/actresses' performances indicate, and what a cartoonized Moon-face (in the case of *Le Voyage dans la lune*) symbolizes, all have to be worked out by the spectators. The demand for spectatorial inference and conception intelligibly transcends the filmic image given intuitively.[16] It calls for disembodied rational connections that will link what is seen and heard to what is meant. The spectators undergo a process not entirely unlike that of understanding a linguistic word—a process of signification. Although the filmic image does not conform to a double articulation, this process is comparable to the act of accessing the denotative signified through a signifier.[17] The use of props and sets as stand-ins for the diegetic world makes the films of the speculative tradition closer to theatre where the reality of the dramatic space is only understood if the spectator is familiar with the medium's conventions. This process of signification relies therefore on both the filmmaker and the spectator: Filmmakers have to make sure that the stand-in objects are easily comprehensible so that the spectators familiar with the convention will grasp what they mean without difficulties.[18] Such is what I call the speculative method of world building.

Lang and Thea von Harbou (who was his wife at the time and co-worked with him on the film) rejected these world building practices of SF cinema prior to *Frau im Mond* (including, to a

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[16] I distinguish *conception* from *intuition* in the same fashion that Immanuel Kant does in his *Critique of Pure Reason*: whereas conception is general, an intuition is singular and individual. Intuition "has an immediate relation to the object" while conception "has but a mediate relation, by means of a characteristic mark which may be common to several things" (222-23).

[17] Christian Metz has pointed out that for cinema, there is no primary or secondary articulation. It also differs from languages (and literature) in that cinematic signifiers (he means images here) are by nature already "expressive" (*Film Language* 79).

[18] For people who are not at all familiar with the tradition of anthropomorphizing nonhuman objects or with the ancient notion of "the man in the Moon," the cartoonized Moon-face will be difficult to comprehend.

certain extent, Lang's *Metropolis*). The theatrically suggested storyworld gives way to a truly cinematic and hence somewhat embodied form of space. This departure from the theatrical tradition transfigured the look of Space exploration SF cinema. It not only carefully constructs a world-experience in the most realistic fashion available, but also pays tribute to contemporary science and technology. Science and technology for the first time feature in a science fiction film as themselves, instead of in the form of some incomprehensible magic. They are treated seriously. Professor Georg Manfeldt who is considered to be mad by the general public in the story is held with utmost respect by Wolf Helius (Willy Fritsch), the protagonist who later leads the team to the Moon. Although technology is for Helius an embodiment of his Romanticist ideal for knowledge and superhuman potency, while for the cartel (or the evil businessmen) it is a way to satisfy their insatiable greed for wealth, it is nevertheless treated in a more positive, or at least complicated, light. No wonder Katharina Loew calls it "scientifically grounded realism" (Gunning and Loew 566).

Among the many ways *Frau im Mond* deviates from the speculative tradition, some appear more outstanding. The diegetic spaces in the film world were photographed in embodied three-dimensional places, either in real locations or in one of Ufa's giant studios where the facsimile was created. The performers therefore traverse and step on the real spaces, carrying out real interactions with their environment. This is particularly true of the interior space of the rocketship and the space on the Moon. Even though the aerial shots that open the launch scene used miniature models, they are beautifully done through crosscuttings with location shots of real performers. Such a preference for embodied space also extends to the portrayal of depth. Whereas the spaces are usually shallow in *Le Voyage dans la lune* and *Aelita*, Lang delivers a sense of depth in every possible way. The opening sequence emphasizes the vertical space of the staircase at Professor Manfelt's apartment building to indicate his solitary lifestyle; the sequence following it where the man from the cartel sneaks into Helius' home to steal his rocket sketches is also rendered with deep space, so that dramatic irony is created to show the unequal knowledge different characters have of the occurring event. The depiction of the launch scene

and Moon-landing remarkably foreground the depth and width of the space. Establishing shots are used to give the spectators a sense of what a rocket launch and its facilities would look like, something no one at the time would have known, not even the rocket engineers. Deep space is also enacted in the scene on the Moon so as to show the vastness of the barren landscape, something not expected prior to the journey. Moreover, this vast desertedness enhances the heroicness of Helius' self-sacrifice. His decision to be the one who remains on the Moon resonates with the cinematic imagery of him standing alone beside the giant rocket against the landscape of the Moon, producing a solemn yet sorrowful sense toward the end of the film.

Most of the methods and stylistic techniques used in *Frau im Mond* will find their way into later Space exploration films, both fictional and documentary. In the aftermath of World War II Space exploration films will revive the embodied tradition: *Destination Moon* (1950), *2001: A Space Odyssey* (1968), and *Marooned* (1969) all follow Lang's lead and develop, each in their own manner, a strong sense of scientificity and of embodied spatiality. More recently there have been films that can be regarded as a third generation in this particular tradition. They have enormously deepened and expanded it by incorporating digital imaging technologies as well as mobile and remotely controlled cinematographic equipment. In Chapter two, I will elaborate on these later films to demonstrate how they carry on such a legacy while pushing further the limits of embodiment by their own means.

The Formative Power of the Imaginary

Not only does the embodied tradition take up the constantly expanding horizons of science and technology but it also contributes to the process of expanding the very horizon of our perceptual world. The imaginary SF films have displayed their formative power to influence and change what is considered the real world—the world as perceived not imaged. It would be extremely difficult for theories that focus purely on the representational aspect of the fictional world to account for such an inverse infiltration of the fictional into the actual. If the fictional world were solely dependent on and subordinate to the actual world, such an impact would be

unthinkable. The proposal of this thesis to consider world as primarily a horizon aims to deal with this issue.

Because our apprehension of an object largely depends on the horizon we take up, the difference between a cinematic rocket and a real one only comes to the fore when I conceive of the former one within a horizon of cinema (an image-consciousness) instead of direct perception. That is, the fictionality regarded as fundamental in theories of world-representation is now considered as a supplement. In fact, the doubleness, or twofoldness (as Richard Wollheim calls it) of the film experience entails the presence of two somewhat contradictory horizons, that of perception and that of image-consciousness. To see the rocket in *Frau im Mond* as an object, one has to suppress the horizon of cinematic materiality, i.e., the attitude to see the whole thing as merely a flat mixture of light and shade. In fact, the immersive experience of cinema lies fundamentally in such an act of suppression and such an imbalanced orientation toward maximizing the perceptual horizon. Paul Ricœur offers an insightful comment on this in an essay published in 1979.

> Imagination is "productive" not only of unreal objects, but also of an expanded vision of reality. Imagination at work—in a work—produces itself as a world. (Ricœur 128)

> The ultimate role of the image is not only to diffuse meaning across diverse sensorial fields, to hallucinate thought in some way, but on the contrary to effect a sort of *epoche* of the real, to suspend our attention to the real, to place us in a state of non-engagement with regard to perception or action, in short, to suspend meaning in the neutralized atmosphere to which one could give the name of the dimension of fiction. In this state of non-engagement we try new ideas, new values, new ways of being-in-the-world. (134)

The "new ways of being-in-the-world" are exactly what these embodied Space exploration SF films are aiming for. Instead of trying to produce something that is totally different from and independent of our perceptual reality, these films attempt to expand our perceptual horizons, and they have succeeded. They have extended our perception as would a prosthetic. The films I am addressing in this thesis therefore contribute to both a general conception of Space (as well as Space travel) and the real science of cosmology and astronautics. They have managed to do so in two major ways: the sponsorship for scientific/technological research and the visual(-auditory)

presentation (both the visual codes and the syntagmas) of astronautic activities.

Dieter Huzel, an officer at Peenemünde's secret German Army rocket center recounts as follows what he felt in 1943 when being shown the V-2 (then called the A-4) rockets:

> I saw them—four, fantastic shapes but a few feet away, strange and towering above us in the subdued light. I could only think that they must be out of some science fiction film—*Frau im Mond* brought to earth. (Huzel 44; Qtd. in Neufield, Preface)

The mention of *Frau im Mond* is by no means accidental, not only because the film stirred a great passion for rocket science and Space travel at that time but also due to a direct connection between the making of the film and the making of the rocket. Fritz Lang's fascination with science and technology is played out not only within the film, but also *without*. It resulted in moving the cinema beyond its own limited industry and directly led to sponsoring contemporaneous technological research in rocketry and astronautics. On the one hand, Space travel procedures, especially the launch and countdown introduced by *Frau im Mond* were directly integrated into the postwar Space programs (reportedly through Willy Ley's personal memory of the film[19]); on the other hand, in order to promote the film, Lang persuaded Ufa to invest in a real rocket launch that later turned out to be a model rocket produced under Hermann Oberth's leadership (Gunning and Loew 562).[20] It became one of the world's first liquid powered, auto-propelled reverse-thrust rockets, anticipating both the V-2 rocket and later modern rockets for Space transportation.[21] In the end, the rocket was not only the selling point of the film but also the idea that pushed forward almost the entire modern rocketry and astronautic sciences, ever since. Understandably, Wernher von Braun, the most important figure in modern rocketry and in the history of U.S. Space programs and to whom we will return in Chapter three, later painted a *Frau im Mond* logo on the base of the first successfully launched V-2 rocket

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[19] Eisner reports that Willy Ley, a German rocket enthusiast and member of the *Verein für Raumschiffahrt* (VfR, or Society for Space Travels) who also participated in the building of the model rocket for Lang's *Frau im Mond* alongside with Hermann Oberth, probably introduced the countdown procedure to NASA when he fled Nazi Germany and later joined the postwar Space program in the United States (Gunning and Loew 579).

[20] Hermann Oberth was one of the fathers of modern rocketry, member of VfR and author of *Die Rakete zu den Planetenräumen* (*The Rocket into Interplanetary Space*), one of the first books to depict a visionary but scientifically plausible way of Space travel.

[21] It is possible that Oberth did not finish the model rocket due to constant delay and Ufa's cut-off of funding, but only produced a functional liquid rocket engine nozzle that makes one step toward the V-2 missile.

(Hardesty and Eisman 2) and called Lang's sponsorship of rocket research "the oddest source of funding in the history of rocket science" (Braun and Ordway 65).

Frau im Mond is not alone in exerting an impact on the real world. The idea of crash landing actually became one of the first widely used methods in the early days of the Space Race for probes and satellites that were not manned. Amongst them, the Soviet *Luna-2* probe was the first to carry out the Mélièsian fantasy by hitting the surface of the Moon on September 12, 1959.

Following Lang was the 1950 U.S. science fiction film *Destination Moon* (1950). This film was among the very first attempts to adapt the Space exploration SF subgenre to an increasing enthusiasm for serious Space travel and exploration after the Second World War. It had been only four years since the picture of Earth was sent back from the camera mounted on a V-2 rocket when George Pal and Irving Pichel produced this motion picture, where the sole focus was on making-possible humanity's first landing on the Moon: the science, the potential technologies, the trip to and return, and, most important of all, the dangers of the journey. If *Frau im Mond* anticipates the serious Moon-landing films, *Destination Moon* is the precursor to many of today's Space rescue features, such as *Gravity* and *Salyut-7*.[22] In this regard, whereas Lang's film helped the development of rocketry and astronautic technologies, Pal and Pichel's film contributed to the field an audio-visual illustration of the potential issues concerning real Space travel, a sensorial rendering of speculation for the scientific community and an easy-to-understand demonstration for the general public. The film also anticipates the Cold War anxiety that the Soviet Union would overtake the United States if the latter did not win the Space Race. Jim Barnes (John Archer), the chief engineer and the central protagonist, presents the basic scientific knowledge about Space travel and Moon landing to a group of private entrepreneurs whose patriotism will lead them to sponsor his research. Interestingly, it is done through an animated sequence with the famous figure of Woody Woodpecker. The animated demonstration reduces the real event of Moon landing in the storyworld to a speculated idea while the film itself

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[22] The film also features major elements that would later be taken up and made well known by other SF blockbusters. The opening credit, for instance, is conducted in the manner of a crawling carpet that disappears at the vanishing point, a clear and reputed signature of the later *Star Wars* series.

acts as much more of an embodied simulation that sets up the world-experience for the spectator. The laughable experience of Woody the Woodpecker in the embedded animation has thus been realistically rendered when the situation happens to the character-astronauts in the filmic reality. In this way, the film can be seen as a mise-en-abyme of the move from the speculative to the embodied traditions of SF filmmaking.

It would not be an exaggeration to say that *Destination Moon* helped build up the mood in the general public for the coming of the Space Race. The Cold War atmosphere, or horizon, was set up when the spectators watched the film, more than seven years before the successful launch of Sputnik-1, the first artificial celestial object to be sent up in orbit. The beeping sound coming back from its broadcasting radio was heard worldwide and it stirred up a public terror in the West. What followed this "Sputnik Crisis" bore striking resemblance to the imaginary events told in *Destination Moon*, making the film both a prediction of and a preamble to the real Space Race. The film is quite ahead of its time not only in its conceptualization of the Space Race but also in its proposition to open Space industries to private companies and capitals. Given the rather successful achievement today in both research and commercial applications of Space technologies by private companies such as SpaceX, Blue Origin, and Bigelow, businessmen like Elon Musk, Jeff Bezos, and Robert Bigelow have indeed come to embody the main spirit of this film. But at the same time, it has to be noted that they also seem to carry on a Cold War mentality to race and colonize, which I will further explicate in Chapter three.[23]

In addition to the thematic and content-related approach, these Space exploration SF films equally contribute to the horizontal expansion of real Space experience through the form of cinematic expression. This is done in mainly two aspects: the establishment of the visual codes (the semantics) and the construction of the syntagmas (the syntax).

Frau im Mond is again the first to offer a concrete example of what a future spaceship, the Moon, and Space exploration would look like. The appearance of the Friede rocket has become

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[23] Despite its deeply entrenched Cold War ideologies, *Destination Moon* is true to the spirit of Space technologies pioneered by *Frau im Mond*, and itself in turn becomes a source of inspiration for later Space (rescue) films, such as *Marooned* (1969), *Apollo 13* (1995), *Salyut 7* (2017) and other contemporary SF dramas such as *Gravity* (2013) and *The Martian* (2015).

the icon for human Space travel, an archetype for almost all rockets to follow. The upper part of the towering giant inherits the look of a bullet but the lower part is attached by four fixed wings which function both as supporting feet when it is standing still on the ground and as devices to facilitate airflow and stabilize the rocket-body when it is flying. The look was taken up by the real rocket engineers who worked on experimental models and later on the V-2 rocket for the Nazi regime. Dieter Huzel's statement quoted earlier can thus be seen as evidence for the lineage in appearance between the Friede and the V-2. This very look of the rocket is also used in films like *Destination Moon* where the designers give it a more streamlined and elongated shape. Coupled with scientific experiments, later developments in rocket industries retain the basic shape of the Friede and add modifications according to a variety of specific needs. If we compare the major rocket types used in the Space Race by both the Soviets and the U.S. (see Figure 1.1), it would not be difficult to see that all of them are indebted to the original Friede from *Frau im Mond* in varying degrees. The launch pads and the service structures are also decidedly modeled after the original designs appearing in *Frau im Mond* (see also Figure 1.2).
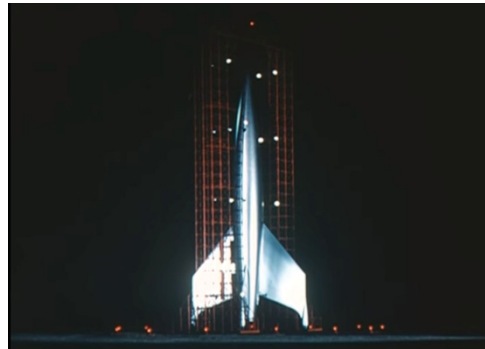

Figure 1.2 Screenshot of Friede in *Frau im Mond* (upper-left) ©Ufa, screenshot from *Destination Moon* (upper-right) ©Eagle-Lion, screenshot of Saturn V in NASA's "The Journeys of Apollo" in 1969 (lower-left) ©NASA, and screenshot of Soviet's R-7 in documentary footage used by BBC's docudrama *Space Race* (lower-right) ©BBC

With regards to syntagmas, the launch scene in *Frau im Mond* starts with a series of aerial shots of the rocket facilities, though this is achieved with the help of miniature models. The segment is followed by a series of shots (from long shot to medium shot) of the rocket as it is being prepared for lift-off, crosscut with shots of the press and onlookers. Then, we are shown several establishing shots of the launch complex from a ground view: the spectator's boxes, the vehicle assembly building, the rail tracks for transporting the rocket from the assembly building to the launch pad, and the service structure that holds the rocket still before ignition. The film is silent, and the images are constantly accompanied by intertitles providing description of the rocket and the launch status. This is a feature that has been absorbed and has become standard for modern television broadcasts of rocket launches. The words representing the voice of a radio commentator continues until the start of countdown for lift-off. When the engine ignites, shots featuring spectators are given as reaction-shots, implying the movement of the rapidly rising rocket. The lack of a tracking telephoto system is thus solved by the use of cut-aways and off-screen space. Later films *and* television programmers so frequently employ such a sequence of images (and sounds) that the combination of these shots (and sounds) have gradually become stabilized and conventionalized. When many television stations broadcasted the launch of Apollo 11, this sequence had already achieved an established status; it had been turned into a syntagma (or a syntax) specifically for the Space program. In a manner reminiscent of claims by Christian Metz[24], we can say that the repeated uses of such a sequence from *Frau im Mond* have attached a certain truth-value to this syntagma. It has gained discursive power, a claim for the reality of the astronautic events it is depicting. In this way, *Frau im Mond* and its followers in Space exploration SF cinema have not only drawn on the scientific horizons of their time but have also contributed significant audiovisual elements and grammars to the horizon of our conception of Space programs and astronautic activities.

Early Space exploration SF cinema has thus played a significant role not only in the history

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[24] In the essay "Problems of Denotation in the Fiction Film," Metz develops his famous model for "*La grande syntagmatique du film narratif*." He attempts to synthesize the most conventional syntagmas used in classical Hollywood cinema (*Film Language* 108-46).

of the genre of science fiction but also in the development of real science and technologies of Space and astronautics. They act as one of the most important driving forces to open up our horizons about the world. But ever since the live broadcast of the Moon landing by Neil Armstrong and Buzz Aldrin in 1969, this relation between film and reality has begun to change yet again. I turn to this issue in Chapter two.

Chapter 2

World Building in Contemporary Space Exploration SF Cinema

> The world is not the mere collection of the countable or uncountable, familiar and unfamiliar things that are just there. But neither is it a merely imagined framework added by our representation to the sum of such given things. The *world worlds*, and is more fully in being than the tangible and perceptible realm in which we believe ourselves to be at home. World is never an object that stands before us and can be seen. World is the ever-nonobjective to which we are subject as long as the paths of birth and death, blessing and curse keep us transported into Being.
>
> —— Martin Heidegger, "The Origin of the Work of Art" 43

Fritz Lang's *Frau im Mond* plays *the* most significant role in connecting the early SF cinema to the modern one, pre-scientific fantasy about Space travel to scientific practices of such, and technophilic Romanticism to expansionist imperialism. In this way, Lang blazed the trail, set up a standard, and popularized the methods for the Space exploration SF films to come. However, this genealogy appears to be more complicated due to the interfusion of two horizons—the perceptual and the imaginary. Following Chapter one, I will start here with how modern Space programs have come into the public attention with the help of the recently available technologies of live television broadcasting. We will see how the latter has reversed the fictionally propelled Space imagination during the early days of SF cinema by establishing the recorded footage (and its form) as belonging to a scientific discourse of objectivity. This conventionalized audiovisual grammar will in turn be fully employed by contemporary Space exploration SF cinema. The chapter will explore how these contemporary films, aided by digital technologies and new cinematographic devices, incorporate such a discourse into the imaginary world-experience and how, by doing so, they push the horizon of Space and astronautics further.

The concept of the "contemporary Space (exploration) SF cinema" is extremely underdeveloped, despite there being constant discussions around "contemporary SF cinema" on the Internet. I find it particularly exigent if we wish to focus on how this subgenre is inextricably tied up with scientific and technological developments. If it is still possible to compose a SF

story about some future society and aliens with little or no knowledge of contemporary science, the task of creating a Space exploration SF in a similar way is almost unthinkable today. This is in part due to the increasing worldwide reception of scientific knowledge about Space. As I have mentioned in the preceding chapter, the rapid development in the fields of modern rocketry and astronautics after World War II soon led to a U.S.-Soviet Space Race. At the same time, these militarily oriented programs also brought back images that people could never have imagined seeing, hence literally expanding the visual horizons of humankind.

The CBS live broadcasts hosted by the legendary news anchor Walter Cronkite of the first Moon-landing totally revolutionized the world-experience of the general public. If scientific knowledge had already prepared people with a representation, an abstract picture of what landing on the Moon would be like (as shown in the simulated images in the first part of the televised program), this live broadcast, for the first time in human history, brought back photo-electronic moving images of humans on the Moon; it made the conceptual idea sensible to its audience, made the representation *presentational*. When Neil Armstrong was shown descending the ladder of the Eagle, the lunar module, and barely managing to set his foot on the surface of the Moon, the world (or our *perceptual* horizon) was no longer the same. Unlike fiction films whose staged nature was already widely absorbed by the audience, the new televisual technology turned imagination into reality. The televisual image showed the astronaut on the Moon, facing the camera, with one hand still holding the rail. It was superimposed by the caption "ARMSTRONG ON MOON," which seemed to be more of verification than an explanation of the image, re-affirming (with a stress on each one of the letters) the impressions felt by the spectators toward this event: the sensorial experience of being there *with* Armstrong and the meaning of a human being reaching the mysterious satellite of Earth, which could otherwise only be seen from afar.[1] The now famous quote "That's one small step for [a] man, one giant leap for mankind"

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[1] Walter Cronkite, as *the* news anchor who covered extensively John F. Kennedy's assassination, the Vietnam War, Martin Luther King Jr., the Watergate hearings, was treated as a spokesman of truth, and many media scholars regarded his news programs in the 60s and 70s as a ritualistic event that made watching his broadcasts a most trustworthy situation. Elihu Katz and Daniel Dayan argue that the "live broadcasts of great events [. . .] transform individuated and stratified masses into the communitas of whole societies. [. . .] They offer the audience a participatory role and propose the reintegration of society" (305). In a sense, the audience's experience of

was thus made literal: with the help of the technology of live television broadcasting, the embodied vision of the camera became the extension of our bodies, the eye of our eyes, and the ear of our ears. The images, therefore, became part of our sensory experience and the world Armstrong visited expanded *our* world-experience and horizon.[2]

In the aftermath of the Apollo missions, new Space programs within and without the United States enormously boosted the evolution of astronautic technologies. With the emergence of Space stations, ushered by the Soviet Salyut series beginning in the 1970s, and the Space shuttles, spearheaded by NASA since the 1980s, Space activities have produced images greatly different from those of the 1900s. Through the rapid distribution of mass communication media, the world-experience of Space underwent profound transformations. Today, with a simple click of a mouse, one can access on *YouTube* live streaming videos from cameras mounted on the International Space Station. Channels such as "Space & Universe" (NASA's official affiliated network partner) have nearly 24 hour live streaming of images coming from those cameras. In a sense, viewing Earth from Space has become an activity almost comparable to checking out one's own backyard.[3]

Living in such an age, spectators cannot be satisfied with Space films constructed through Mélièsian tricks. The appetite for cinematic renderings of believable and immersive Space adventures has led the film industry and SF filmmakers to readjust the genre's position. The major concern of this chapter revolves around the influence that the widely spread knowledge about astrophysics (even at a basic level) and Space images already absorbed as an extended world-experience have had on the contemporary SF world building practices. While the interaction between the film industry and the Space industry, as seen in the case of Lang's *Frau im Mond*, is still undeniably present, contemporary cinematic images and sounds of Space are

"not-being-there" in their viewing of the live television programs actually is "*more,* somehow, than that of being there;" it offers a "sense of occasion" (308-09, original emphasis). Hence, as a narrator of the history, Walter Cronkite helped made the live images of the event believable and even affectively sensible. A critique of this can be found in Susan G. Davis's review of Dayan and Katz's book.

[2] The audiovisual expansion of horizon takes place directly on our perception, while pre-photographic (written and oral) documents can only expand our conceptual horizon. I will discuss more on this issue in the Conclusion.

[3] The embedded issue of such "world-images" will be addressed in the next chapter as I turn from the phenomenological senses of Space images to that of our conceptions of life and Earth.

greatly indebted to the proliferation of visual and auditory experiences conferred by real Space activities.

Viewed against the scientific/televisual images of Space programs, contemporary Space exploration SF films appear to have converged toward the same aesthetics—what I shall call "embodied science fiction realism". In Chapter one, I have expounded on the two distinct approaches to Space SF world building: the speculative tradition ushered by Méliès and the embodied tradition that began with Lang's enthusiasm for real rocketry and astronautic sciences. One thing that slightly complicates matters here is that the embodied method does not entirely discard the speculative ways of cinematic display. That is, even though such films seek a look that makes them almost indistinguishable from non-fictional scientific or documentary footage of Space, they still strive to offer viewers a spectacle. As a result, the products of the embodied method usually end up as a "synthesis" of the two approaches, providing the spectators with a *scientific spectacle*, one that does not only function as an attraction but also, and more significantly, as a subliminal wonder. As I have said, the shift can also be viewed as one that goes from cinema as *spectacle* to cinema as *world*, from fragmentary spectacles to immersive ones. To achieve this, two major aspects of formal construction have to be carefully managed: the scientifically informed realism of image and sound, and the embodied experience of S/space.

Footage of Science and Footage of Fiction

Space exploration SF films try as much as possible to call on real science and put great efforts in reproducing the audiovisual qualities of scientifically made or sanctioned documentary footage. This feature is however somewhat tricky, since Darko Suvin has famously defined Science Fiction as a genre of "cognitive estrangement" and hence distinct from "realistic" traditions (375). But it is important to note that Suvin's definition relies on an additional condition, according to which, SF lies somewhere between positivist naturalist accounts and the other fantastical genres. SF usually "introduces into the old empirical context only *one* easily digestible new technological variable" ("Poetics" 376; original emphasis). While the actual

situation sometimes cannot be captured by Suvin's definition against realism, it is usually
consistent with this additional statement. Without going into too much detail in the discussion
over realism, which I am sure deserves a proper treatment in another thesis, I will focus now on
explaining what I mean by "embodied science fiction realism".

If I may quote Susan Sontag as a testimony for what SF films were like during the 1950s and
1960s, we can see a clear contrast between those films and our contemporary Space exploration
SF.[4] Sontag regarded the SF cinema of that era as an excellent response to a two-sided fear: one
for "unremitting banality" and the other for "inconceivable terror." Hence, SF films either help
us to "escape" the boredom or "inure" us to unbearable disaster (42). They were not so much
about science than about morality: the technology is beneficent (or at least neutral) while the
"errant individual will of a lone intellectual" is poisonous (48). The point is that simplified
morals always surpassed the interest for science in those early post-war SFs while technology
was mainly responsible for spectacles. In comparison, a particular string of Space SF films led to
an alternative path. *Destination Moon*, as I have mentioned, was a rare precursor that appeared
before the inundation of SF blockbusters that dominated the 50s and 60s. It was not until the end
of the 1960s that this subgenre really gained its ground. 1968 saw Stanley Kubrick's *2001: A
Space Odyssey* and a year later *Marooned* was released immediately following the live broadcast
of Armstrong's and Aldrin's landing on the Moon. However, these are not yet what can be
properly called "embodied science fiction realism" for their rendering of Space as well as Space
travel is still largely speculative and not yet embodiedly immersive as their counterparts today.[5]

Despite an interruption by the disembodied world building practices pervasive in the 1960s
and 1970s which deviated from Lang's tradition by emphasizing the lack of depth and spatiality
of the emerging cyber technology, contemporary Space exploration SF films appear to have

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[4] I have to emphasize again that what I am dwelling on in this thesis is the Space exploration SF film. I am not
referring here to other SF films or SF literature that only use Space as a backdrop. For instance, Space operas such
as *Star Wars* series or *Star Trek* series are typically not concerned with currently available or highly potential
scientific understanding of Space and astronautics, wherefore I exclude them from the category treated in this
chapter. In a slightly self-confusing manner, Space exploration SF films are actually more akin to other Space
exploration (non-SF) films, both fictional and documentary.
[5] I will elaborate further on this when I discuss in Chapter three embodied science fiction realism's relation to the
world-picture and why it was not possible to speak of it before Apollo 11's Moon landing.

inherited more directly the scientific rigor and limited cognitive estrangement popular in the earlier films from the 1950s and 60s. The re-emergence of serious Space exploration films such as *2010: The Year We Make Contact*, sequel to Kubrick's *2001*, in 1985, *Apollo 13* in 1995, *Contact* in 1997, *Deep Impact* in 1998, *Mission to Mars* in 2000, etc. all go back to the rich resources of the earlier tradition of *Frau im Mond*. Robert Zemeckis's *Contact*, for instance, was even reputed for the direct participation of Carl Sagan, one of the better known astrophysicists and science writers of modern times, ensuring that the film offered a rigorous engagement with astrophysics, while at the same time embodying some of its theories.

The reignited interest in Space exploration had everything to do with the newly operational Hubble Space Telescope (launched in 1990) and a much better knowledge of our Solar System thanks to the help of manmade Space probes. Inspired by the picture of Earth as a small blue dot sent back by the Space probe *Voyager 1* as it was leaving the Solar System on February 14, 1990, Carl Sagan's 1994 book *Pale Blue Dot*, which was written in a poetical way, reflects on our humanity, on history, and on the universe. Both Sagan and his book played a central role in this renewed enthusiasm, which in turn called for an update in SF cinema's world building practices.

As I have mentioned, television/digital live footage of real Space and astronautic activities have profoundly transformed the world-experience and horizon of the general population. Speculative moving images are no longer believable if they do not conform to the images brought back from Space. Against such an atmosphere, the 1969 live images of the Moon landing have not only expanded our horizons, they have also dominated and sanctioned the "look" of Space ever since. As our extended sensory organ, the audio-visual experience of Space becomes *the* proper fact of the real Space. So long as Space travel is limited to specially trained personnel, such dominance will last because of the truth-value it entails. Thus, the baseline or the "zero world" as Suvin calls it ("Poetics" 377) is no longer the perceptual world *as such*, but rather the world-experience given through the very first astronautic images.

There is not much work done on the construction of such images and sounds within the scientific and astronautic realm, but the "Curious Droid" channel on *YouTube* did brilliant

research and presentation, detailing technological developments in the recording equipment in Space programs.[6] The team has traced the modern day rocket launch video aesthetics to the early days of rocket tests in Germany, where the recordings of the launch were not intended to awe audiences but to help researchers and technicians in identifying problems and keeping track of the conditions of each launch. This activity, started when Walter Bruch developed the world's first CCTV system at the missile facility at Peenemünde in Germany, evolved into two different kinds of techniques: on the one hand, the camera technology developed from hand-held/cranked devices housed in nearby bunkers—an extremely dangerous work—to modified cameras (developed by Clyde Holliday) that can withstand the shock and be fitted onto the body of a V-2 rocket, and finally to live TV broadcast equipment that can transmit the images immediately back to Earth while being remotely controlled. On the other hand, tracking systems grew from the photo-sonic platform "Bright Eyes," a track-and-shoot device based on an M-45 anti-aircraft cannon (developed by Clyde Tombaugh in 1946 at the White Sand testing ground in the United States), to the modern day Contraves Kineto-Tracking Mount (KTM), a remotely operated system capable of filming the lift offs of Space shuttles, and to the more recent Recording Optical Tracking Instrument (ROTI) upgrading the focal length and extending the tracking of the rocket up to more than five minutes after lift-off.[7]

Hence, we observe in the early astronautic activities two major approaches for producing documentary images of rockets. The first offers both a close-up *of* the rocket and a view *from* the rocket. Shockproof cameras are installed throughout the service structure that surrounds and supports the rocket before the launch, providing a multi-angle coverage of the lift-off. The images captured by such cameras (namely the structure's releasing of the rocket, usually accompanied with huge smog rising from the bottom; the slow motion bird's eye view of the rocket lifting off; and the low angle view from the launch pad of the rocket's ignition, frequently

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[6] This video essay entitled "How did NASA get those great film shots of Apollo and the Shuttle?" by "Curious Droid" can be found on YouTube. <https://www.youtube.com/watch?v=BlPfHV36G-g> The channel "Curious Droid" is famous for its in-depth research and the almost academic quality of its video essays.

[7] The extended tracking shot offers a telephoto visual experience of a rapidly rising rocket, although it is rare for fiction films to retain the entire duration of rockets' trajectories.

with the nozzles gradually enshrined by the flame) have become stereotypical images in today's television broadcasts of rocket launches. These images are, moreover, almost always accompanied or preceded by a countdown through voice-over. Inversely, when cameras are attached to or fitted onto the body of the rocket, the images display the view *from* the rocket. Sometimes, they show the launch pad covered in smog and receding as the rocket lifts off, or else the ground structures are seen left behind (an example of which is the famous 1946 V-2 images of Earth I mentioned). Other times, what we see are images *of* the rocket body/space shuttle against the sky, or even the interior view of the rocket vehicle jettisoning its first-stage booster and the separation between rocket and payload. In addition to the first technique, the second one consists of establishing shots as well as tracking shots. The tracking system stationed at some distance from the launch pad is able to provide a clear view of the entire launch facility: the testing ground, the sky, the launch complex, the service structure, and the rocket. After the lift-off, the tracking shot usually retains the rocket at the center of the frame, with the image slightly shaking before the accelerating rocket vanishes completely from the view.

These views, when combined into a sequence, resonate in part with the tradition set forth by Lang's *Frau im Mond*, although Lang shot the segment using miniature models. Live television broadcasts of rocket and space shuttle lift-offs in turn conventionalized such segments into a fairly strict audiovisual syntax. Such segment, once conventionalized, can generate a sense of reality corroborated by science. An early example comes from the live broadcast of the Apollo 11 mission. In the 20th anniversary special program produced in 1989, NBC News released the original footage of the lift-off taken on July 16, 1969 covering from ten minutes before lift-off (or T-10min as it is technically called) all the way to 6 minutes after it (T+6min). The sequence starts with several establishing shots of the Launch Complex 39 at the Kennedy Space Center (with and without journalists present in the foreground), followed by a closer shot of the launch complex. The images then crosscut with a high-angle shot overlooking the interior of the mission control center with staff and personnel each minding their own tasks at stations tidily lined up. Alternating with it are some telephoto close-ups of the upper part of the service structure and the

massive Saturn-V rocket where the Apollo spacecraft is located. The lift-off begins with an alternating montage consisting of establishing shots of the ignition illustrated by the rising flame and telephoto close-ups of the flame that starts to devour the lower part of the rocket. We see enormous smoke rising from the bottom, covering part of the view of the rocket. Following that is the establishing shot of the lift-off and a series of close-ups of the rising rocket with fragmentary materials falling off its body (see Figure 2.3 for reference), taken by anti-shock CCTV cameras installed on the service structure. The sequence ends with images where the tracking system fixes the rapidly rising rocket in the center of the frame, showing the rocket piercing through clouds and finally vanishing from sight. The images are accompanied throughout by a superimposed subtitle indicating the countdown towards the launch time, the caption of the program, and a slightly vague and indistinct voice-over coming from an intercom system that describes the ongoing procedures.

Figure 2.1 Snapshots from NBC's live broadcast of the Launch of Apollo 11 in 1969 (left) ©NBC and snapshots from NASA's footage of the launch of space shuttle *Atlantis* for STS-129 in 2009 (right) ©NASA

A somehow standardized visual syntax and its related visual codes are clearly discernible by

comparing television footage of different eras (see Figure 2.1). The realistic effect of rocket launches and of Space travel was thus achieved and formalized through the condensation of those images and sounds in an audiovisual language taken up for real scientific and documentary purposes.

The pervasiveness of such audiovisual standardization can be easily recognized in modern Space films such as *Apollo 13*, *Interstellar*, *The Martian*, and *Salyut-7*, etc. It follows that the impression of reality of Space exploration (SF) cinema does not only rely on the truthfulness of the scientific knowledge referenced, but also on the look (and sound) the film can offer, i.e., the perceptual experience it affords. This is especially the case for those who are not experts in the field of Space exploration and do not possess first-hand knowledge of Space travel.

In his famous essay on film tricks (or "*trucage*" as he calls them), Christian Metz argues that it is difficult to pin down the boundary between a *trucage* and optical effects that function merely as grammatical markers. Some of the optical effects we now regard as belonging to the punctuation system (hence the syntax) of cinema used to be effects (*trucage*). The change is usually a result of *trucages* being stabilized and turned into unnoticeable conventions by the "force of habit" ("*Trucage*" 666). Interestingly, what we see in contemporary Space exploration SF films such as *Gravity* and *Interstellar* can be regarded as a unique way of appropriating such tricks. In these two films, the invisible *trucages* (both CGI and traditional) are used in a way to exploit the conventionalized visual traits of television broadcasts and documentaries of contemporary astronautic activities, so as to achieve ultra-realistic effects.[8] The fact we take much of the film's Space exploration segments to be shot realistically is due in good measure to the visual syntagmas (i.e., the broadcast sequences of conventional astronautic events) and the look (i.e., the appearance of Space above the atmosphere as well as the look of astronautic vehicles, equipment, and apparel) used in constructing the experience of Space travel. Both the

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[8] In his essay, Metz distinguishes "imperceptible *trucages*" from "invisible" ones in that the former involve tricks that are not noticeable to the audience, such as the use of stunt man, while the latter tricks are sensible but cannot be located by the audience ("*Trucage*" 663-64). *Gravity* and *Interstellar* are conceived as fiction films, hence, spectators do expect the use of tricks in portraying sequences that take place in Space, but due to their resemblance to scientific and documentary footage the tricks nonetheless remain invisible. In this way, the films achieve the realistic effect of Space exploration.

syntagma and the look (as well as sound) have now been widely accepted and established as conventional audiovisual rendering of what real astronautic activities feel like. As long as the majority of spectators still cannot travel in Space and experience a Space flight first hand, these established tropes can continue to realistically stand in for such events.[9] In a sense, they *are* the reality. As spectators, we only know such cinematic events are fiction if prominent *fictional* elements emerge, such as the presence of well-known film stars, non-existing technologies, currently impossible events, etc. Many effects are thus sensible but remain invisible in the film.

Figure 2.2 Screenshot from *Interstellar* (left) ©Paramount Pictures and snapshot from Apollo 4's footage of the first stage separation (right) ©NASA

Figure 2.3 Screenshot from *Interstellar* (left) ©Paramount Pictures and snapshot from Apollo 11's lift-off footage (right) ©NASA

As can be seen from similarities in the above images (see Figures 2.2 and 2.3), *Interstellar* and many other contemporary Space SF films make full use of these audiovisual syntagmas and visual codes that have been conventionalized through years of television broadcasts. The fiction, in this manner, simulates what real scientific and astronautic events look like and even emulates

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[9] Hans Blumenberg names such an effect of experiencing Space without really having been there "astroneotics" as opposed to "astronautics" (*Vollzähligkeit* 548). As we can tell from the word, the *noesis* takes the place of *nautes*, hence making such experience a purely mental activity in contrast to the astronaut's real embodied experience in Space. See also Lazier's comments on Blumenberg's concept (620).

them qualitatively. The effects, or *trucages*, used here are rendered almost indistinguishable from non-fictional documentary footage, hence establishing an invisible *trucage*. Since the documentary footage is itself image and mediated rather than directly perceived, it calls into question the "baseline" (or "zero world" as Suvin calls it) of the photographic image that is used by spectators as a standard for separating special effects from non-effect images in a film. Usually, spectators can identify the nonrealistic elements in a film by comparing them to non-effect photographic images of ordinary events. In this way, such nonrealistic elements are understood to be the products of special effects. The situation of Space exploration is unique because few spectators have first-hand experience of it. Their audiovisual experience based on previous documentary footage is the only reality of Space activities they can refer to. Because Space exploration SF films and non-fictional documentary footage share the same medium, and now even the same visual codes and syntagmas, it can be almost impossible for spectators to differentiate the two. While such a situation is not entirely obvious in *Interstellar* as Nolan is using the visual codes and syntagmas only to supplement the main plot of interstellar travel, Cuarón pushes the limits further in making of *Gravity*.
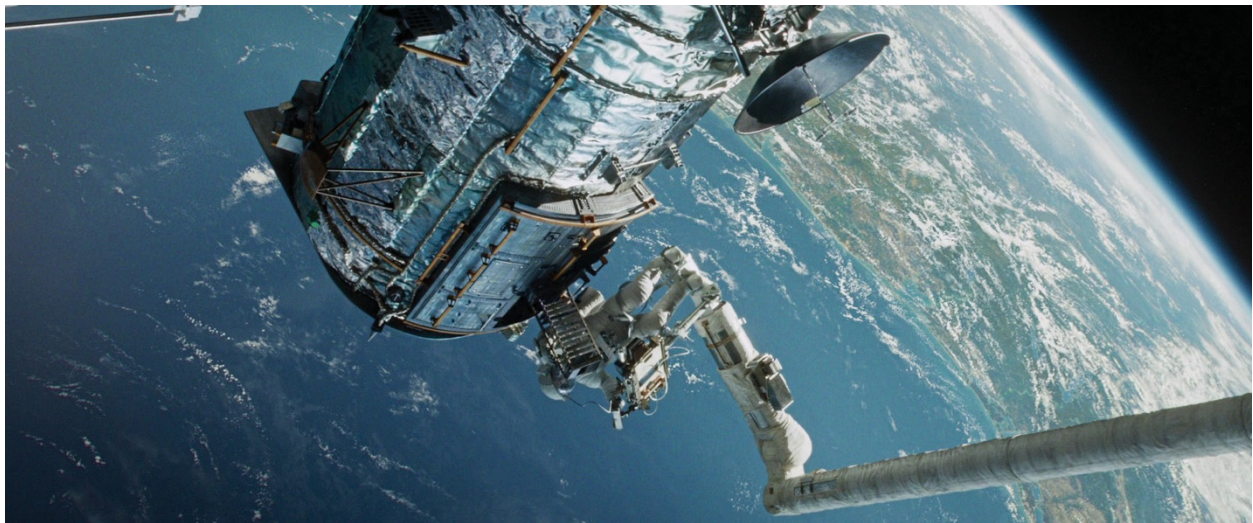
Figure 2.4 Screenshot from *Gravity* (top) © Warner Bros.

Figure 2.5 Screenshot from *Hubble* (lower) © IMAX and Warner Bros.

In *Gravity*, the CGI animation that makes up the major portion of the film greatly obscures the boundary between effects and (pure) cinematography. According to the information provided by the production team,[10] computer imaging is responsible for almost 80% of the film, and in some space-walk scenes, Sandra Bullock's face ends up being the only photographic image in the final cut (Extra from *Gravity*'s Blu-Ray). The production team preprogramed an animation that details all the camerawork required for the actual shooting, the "Previs" (a low-resolution animated version of the film, serving as a sketch and blueprint), the "Prelight" (i.e., lighting designed for all sequences), the "Pre-DI" (i.e., coloring and timing), and the "Techvis" (i.e., the type of devices, the angles, the moving trajectories, the speed and so on). The data was then entered into the performing platform where the performers acted without actually moving. Instead, it was the computer-driven cameras that moved and performed acrobatics on a 12-wire motion control rig according to the preprogrammed trajectories (B 42). The platform was surrounded by a light box (which is a LED box), which the team designed to provide digitally controllable lighting that could change according to the camerawork and facilitate the immersiveness for the performers. It displayed a previsualized environment that corresponded to

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[10] Both in interviews and the making-of extras provided in the DVD and Blu-ray disks, the production team reveal that a huge proportion is produced by CGI and animation-initiated cinematography and lighting. They regard such practices as a great innovation in film industry and for special effects. See B, Giardina 30, Giardina and Kit 85, ShootOnline 27, and the Blu-Ray Extras.

what the characters are actually seeing in the storyworld and at the same time provided constant lighting throughout the shooting according to the programed plans. The images captured by the acrobatic cameras were then modified by software and synthesized with photorealistic animation that added to the images details of the spacesuits, the visor and its reflection, the spacecraft, the surface of Earth, and almost everything else seen in the film. Needless to mention, the CGI is also responsible for most of the lens flares and chromatic aberrations we see in the images so that spectators can be tricked into believing that the film is made photographically (48). Animation, or *trucage*, takes the lead in the making of *Gravity*, while the quality of (pure) cinematography becomes an *effect* to be reached (see Figure 2.4 and 2.5 above). Not surprisingly, the cinematographer Emmanuel "Chivo" Lubezki concluded that "[i]n the process [of filming], [he] had to learn to use some new tools that are part of what cinematography is becoming" (37).

Despite the publicity of Nolan's adamant insistence on using more traditional methods and non-digital equipment, a similar situation is equally noticeable in *Interstellar* where the production team had to digitally construct the mind-blowing images of the wormhole and the black hole. Astrophysicist and Nobel laureate Kip Thorne was invited to counsel on the CGI visualization of the cosmic objects. In a way reminiscent of Fritz Lang in 1929, the film industry once again interacted with and funded scientific research in astronomy. As a result, the special effects team even published articles on the film's visualizing process in *American Journal of Physics* and *Classical and Quantum Gravity*. The use of CGI offered an opportunity to make abstract theories into something sensible, and, moreover, to explore how the wormhole's parameters influence what the camera can see in that particular position of embodied space (James et al., "Visualizing" 486). It also helps to investigate what the "gravitational lensing" would be like if the camera were positioned very close to the spinning black whole (James et al. "Gravitational Lensing"). The film, thus, functions also to some extent as a large screen simulation for theoretical astrophysics.

In terms of sound, the filmmakers have invested an equal amount of effort in securing the phenomenological sensation of Space that conforms to scientific claims. Sound is not heard in

Space, as both the advertising campaign for *Alien* (1979) and modern astrophysics have told us,
because sound waves cannot be transmitted in the vacuum of Space. The filmmakers of *Gravity*
have therefore opted to restrict directly audible diegetic sounds to interior spaces that are
air-filled: the radio-transmitted conversation we hear inside the characters' helmets, the radio
communication between Dr. Ryan Stone (Sandra Bullock) and an unknown source on Earth
inside the Soyuz spacecraft, the rustlings of suits and objects, and other sounds that emerge from
interactions in the interior of the Space Station. It is strictly maintained that all exterior activities
are not directly presented by sound[11]. To better reproduce the auditory experience of Space,
Glenn Freemantle, the film's sound designer, decided to use vibrations, such as touch and bodily
collision, as a medium for the sound track (Extras from *Gravity*'s Blu-Ray). Consequently, when
Dr. Stone escapes the Soyuz and approaches the Tiangong Space Station, the fire extinguisher
she uses as a thruster is not heard. However, her collision with a solar panel in that scene is
vividly expressed on the sound track by deep rumbling sounds that mimic the vibration inside
one's body passing through the bones. Simultaneously, these vibrations are also transmitted to
spectators through those of the seats. The Dolby Atmos system has rendered it well, by
producing a dense and powerful sound wave that shakes the theater seats (in a manner similar to
how we usually experience explosion scenes). Besides this, other sound effects, such as
scrapings or explosions are recorded literally through vibratory sound (Bender). In so doing, the
film not only complies with astrophysical phenomena but perhaps can also be used for
pedagogical purposes.

  As for *Interstellar*, apart from the almost constantly present atmospheric music composed by
Hans Zimmer, a scientific treatment of sound effects is also prominent. One particularly
memorable scene for such sound effects takes place about two hours into the film when Dr.
Mann (Matt Damon) attempts to dock Endurance, the mother ship, before the other characters
wishing to abort the mission, catch up and stop him. The sequence is intense. It intercuts between

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[11] However, despite such efforts by the filmmakers, it can still be noticed that the diegetic events are usually
accompanied by atmospheric scores and other synthesized sound effects that enhance the emotional intensity and
thus act almost as diegetic sound.

Dr. Mann who steals the Ranger shuttle, trying to dock Endurance and Cooper and Dr. Brand who pursue Dr. Mann onboard the Lander, attempting to stop him. The close-ups of Dr. Mann's attempted docking are taken from an exterior perspective and deliberately done without the sound of the clashing metal. These close-up sequences create a series of breath-taking moments inside the rapid and intense rhythm of the alternating montage: the repeated warnings Cooper gives to Dr. Mann—"Do not attempt docking"— intervenes the musical score, while the gaps between each of Cooper's warnings match up with the constantly repeating motif of the score (a same duple-meter bar repeating itself) that Zimmer composed to resemble human heartbeats. Thus, the beat of the music and the sound gradually affect the spectators' breathing, leading to their synchronization, and at the same time enacting a feeling of nervousness. Scientific spirit here matches perfectly with aesthetic creativity.[12]

Thus viewed, both films have literally been turned into "vast *trucages*" (Metz, "*Trucage*" 670). Of course, what Metz means by this term is the idea that cinema in general is *trucage*. Without endorsing such an extreme position, I do find many digitally produced Space exploration films to be literal *trucages* for the most part. What *Gravity* and *Interstellar* have achieved is an ultra-realistic effect of Space exploration because the shared visual codes and syntagmas produce in them an audiovisual experience that is continuous with the experience we have when watching a NASA documentary. With the increasing use of CGI, computerized and preprogrammed cinematography and lighting, Space exploration cinema has been transforming itself into an apparatus of effects that exploits visual conventions and syntax to mimic their non-fictional counterparts.

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[12] A similar and equally brilliant case can be found in Kubrick's *2001* when David Bowman (Keir Dullea) manages to return to the spacecraft *Discovery One* (after being denied by the AI, Hal 9000) by manually opening the hatch. The sequence focuses on the moment before Bowman ejects the explosive door of his EVA (extra-vehicular activity) pod when the character pauses and tries to gather enough oxygen in his lung. Spectators expect a blow, a huge and thundering sound that would follow the shot. But it is denied. The next shot is remarkably done in total silence. We see the door explodes, sending Bowman into the interior space of the airlock in the spaceship, hitting the walls, and finally managing to stabilize himself by holding onto the rail and shutting down the hatch. Not until the door is shut and the space is filled with air can we begin to hear sound. Kubrick has succeeded in building a deceptive expectation in the audience that is only to be corrected later as a surprise, while such a surprise, spectators finally realize, actually conforms to science.

Embodied World-Experience and Spatiality

In addition to the visual codes and syntagmas, contemporary Space exploration SF films also endeavor to create a sense of real spatiality. Both visual and auditory elements participate in such a construction. Despite the already pervasive use of visual codes and syntagmas from lift-off footage, the early day Space exploration SF films still largely conform to the relatively static camerawork used in classical Hollywood cinema. In terms of their representation of Space travel, the interior scene of the rocket/spacecraft, and the alien environment, films made prior to *2001: A Space Odyssey* deviated little from the standard set by Fritz Lang in the late 1920s. Space travel happened almost entirely inside the spaceship, the crew was usually depicted as tied up to their bunks in a similar way to people travelling in boats or in sleeping cars on trains. Views of Space outside the window were extremely restricted. Most significantly—due largely to technological limits—the weightlessness or zero-G effect was more frequently stated through dialogues than presented audiovisually through performance, cinematography, and sound. All these aspects of the depiction of Space travel are very different today.

Yet, the evolution of the cinematographic and auditory aesthetics in SF cinema is rather complicated. As mentioned above, the aesthetics of today's Space exploration SF films is neither a straightforward development from the embodied traditions of Lang nor an absolute abandonment of the speculative methods of Méliès. In the last chapter of *Screening Space* added for the 1987 enlarged edition, Vivian Sobchack summarizes that Space travel in films of the 1950s had "an aggressive and three-dimensional thrust—whether it was narrativized as optimistic, colonial, and phallic penetration and conquest or as pessimistic and paranoid earthly and bodily invasion" (226). The situation, however, changed rapidly with a certain loss of interest in Space travel (and Space) during the 1970s and 80s. With the emergence of video and personal computers, Sobchack contends, the change in technology led directly to the change in our "contemporary 'sense' of time and space," which in turn transformed the SF cinematic aesthetics of the age (223). Whereas in SF films of the 1950s space was presented as "deep" and time as "accelerating and 'urgent'," the emerging electronic technologies in the 1970s overturned

such conceptions.

> [S]pace became semantically inscribed as inescapably domestic and crowded. Time lost its urgency—statistically stretching forward toward an impoverished and unwelcome future worse than a bad present. Pointing to the dystopian despair of a country negatively involved in both domestic and international contestation and unable to avoid its representation in constant and pervasive media imagery. (226)

> Today's [1970s-80s] SF film evidences a structural and visual willingness to linger on "random" details, takes a certain pleasure (or, as the French put it, "*jouissance*") in holding the moment to sensually engage its surfaces, to embrace its material collections as "happenings" and collage. Indeed, both playfulness and pleasure are cinematic qualities new to SF in the late '70s and the '80s, replacing the cool, detached, and scientific vision authenticating the fictions of its generic predecessors. (228)

As a result, Sobchack concludes, "Space is now more often a 'text' than a context" (232). There seemed to be a tendency to align Space with cyberspace in the years when digital and other electronic technologies started to invade and pervade people's everyday world-horizon. In this vein, enthusiasm in the embodied three-dimensional Space gave way to a frenzy of virtual space that is two-dimensional and omnipresent, and for a certain period of time in the 1970s and 80s, interest in the exploration of virtual reality replaced that of real Space (as can be seen in films such as *Tron* in 1982).

Now, almost twenty years into the 21st century, Sobchack's conclusions regarding SF cinema of the 1980s require updating. The increasing tendency since the 1990s, as I mentioned earlier, has signaled a return to the embodied tradition inaugurated by *Frau im Mond*, both in numbers and in phenomenological quality. Recent films have developed a particular focus on the *experience* instead of the *goals* of Space travel and extraterrestrial activities.[13] If earlier films such as *Forbidden Planet* (1956) mainly employed the alien planet as an exotic location (or unimportant background) for the (psychoanalytically flavored) story to unfold, recent films take Space and extraterrestrial environment as one of the central focuses. The very world-experience is one of the major things these films want their spectators to arrive at. Diverse though their

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[13] In an interview, Cuarón comments on his emphasis on affect created by camerawork as parallel to an interest in the story, "the story is like the cinematography, the sound, the acting and the color. They are tools for cinema, and what you have to serve is cinema, not story" (B 41).

themes may be—Space colonization tales like *Avatar* (2009), *Moon* (2009), *District 9* (2009), *Elysium* (2013) and *The Martian* (2015), Space exploration films such as *Mission to Mars* (2000), *Solaris* (2002), *Prometheus* (2012), *Gravity* (2013), *Interstellar* (2014), and *Passengers* (2016)—these films all share an interest in building world-experience, which was lacking in *Le Voyage dans la lune* and *Aelita*, but was crucial since *Frau im Mond*. In all these recent films, one can indeed perceive some prominent traces of and development from earlier attempts in *Frau im Mond*, *Destination Moon*, and *Marooned*, in the way they seek to construct an immersive S/space all the while provoking strong affective resonance toward them.

In fact, one of the most significant achievements in contemporary Space exploration SF cinema is its ultra-realistic constitution of S/space. It is at once an act of constructing (outer) Space and an exploration seeking to create the sense of space through spectators' kinaesthetic resonance. That is, these recent films have created for spectators a world-horizon that they take up by kinaesthetically (and virtually) feeling it. This tendency in contemporary Space exploration SF cinema is directed at experiments with what audiovisual media can accomplish by maximizing spectators' affect through (special) effects. Contrary to SF films in the 1980s, which Sobchack sees as the epitome of a sort of cinema where effects replace affect (*Screening Space* 285), the contemporary productions mentioned above reverse the trend and return instead to affectivity as their primary goal. I have to note, however, that these Space SF films do not represent the general trend in contemporary SF cinema. They follow an alternative path to other fantastical blockbusters, namely Space operas such as the *Star Wars* series. Nevertheless, their tendency of minimizing the perceptibility of effects and maximizing the affectivity of the film experience make them of particular interest to my research. These films (among which *Gravity* and *Interstellar* are prominent examples) are crucial for understanding the interactions between the subgenre of embodied SF, current astronautic activities, and the SF cinematic traditions. Such practices of experience building (or horizon shaping) involve development in both technologies and techniques.

The development of digital cinema has hugely transformed the way images can be produced.

For instance, while Steadycam helped in solving problems relative to camera movements, digital technology takes a step further by greatly reducing the size of cameras without sacrificing image quality. An evident example can be found in point-of-view shots; the awkward camerawork in *Lady in the Lake* (1947) is now replaced with high definition images from a subjective perspective in *Hardcore Henry* (2015), made possible by wearable digital recording devices, namely GoPro cameras. The contemporary POV shot leaves behind the generally static bulkiness that resulted from the large and clumsy equipment of analog 35 mm cameras, replacing it with the mobile swiftness of new cameras. As a result, the image acquires a quality that better approximates what a person would see. Similarly, motion-control rigs enable filmmakers to accomplish acrobatic motions that are unthinkable for a human cinematographer, such as the extremely rapid movement of the camera going from a long shot to a close-up and back again, as shown in several sequences of *Gravity*. These shots are all software-programed and motion controlled via the rigs. Furthermore, commercial drones have made aerial cinematography much less costly and much easier to do, and submarine cinematographic equipment has become more affordable and has made location shooting more flexible.

As I mentioned in the first section above, *Gravity* also makes use of an entirely new lighting system, which consists of a 20 by 20 feet LED light box. Such equipment "enable[s] the real faces to be lit by the very environments into which they [will] be inserted, ensuring a match between the real and virtual elements in the frame" (B 44). According to Emmanuel Lubezki, *Gravity*'s cinematographer, the old method of using real light produces only one color, one tone at a time. In many circumstances for the shooting of *Gravity*, it would have been problematic to simulate a light source that is located hundreds of kilometers away from the character. With this new technology, the light box shows the animation of the environment so that all light sources are simulated at once and are easy to manipulate according to the needs of a given set-up. For instance, the very situation of Dr. Stone determines that she has to be lit by constantly changing sources: the sunlit side or the dark side of Earth, the reflection of the space shuttle, or the profound darkness of the vast universe. The team has also used such equipment to achieve

minute lighting details such as the particular light tones and color temperature when the characters are against the background of the Sahara desert—which produces a warmer color—or the Gulf of Mexico—whose reflection is cooler but with higher reflectance due to the oceanic water.

These technologies are crucial for producing a believable and ultra-realistic Space, the low-Earth-orbit (LEO) Space to be specific. While these may be works mainly of *trompe l'œil*, the employment of such technologies in moving cinematography and its animated counterpart plays a truly essential role in phenomenologically enacting a sense of space in (outer) Space.

The idea of simulating human experience by maximizing the potentiality of camera movement has been excessively explored in recent Space exploration films. What was hardly plausible at the time of *Frau im Mond* can now be effectively achieved. In Christopher Nolan's *Interstellar* (2014), much of the camerawork is done by smoothly moving the IMAX camera back and forth in between the characters in a studio. To shoot the scenes inside the spaceship Endurance as well as the Rangers and the Landers, both cameras and actors are suspended by wires and lifted off the ground to simulate a sense of weightlessness. The highly mobile camerawork (even with a relatively heavy IMAX camera) is carried out smoothly by the cinematographer Hoyte van Hoytema, whether it stands beside, facing, or is following the characters. The camera, as if present in the very space, traverses and floats through it alongside the characters. Its manipulation is flexible enough to pursue the performers' movement through the complex and compact structures of the spacecraft.

Similarly, in the repeatedly lauded opening sequence of *Gravity*, the (virtual) camera starts with a distant view of the globe and then moves closer toward the Space shuttle Explorer. The approaching movement appears to be slow at first against the vast globe of Earth but starts to feel a little faster when the shuttle and the astronauts come into our sight. Note that this approaching move is not done straightforwardly by a normal zoom-in, but rather in a manner of floating that much resembles Commander Matt Kowalski's (George Clooney) Space walk—which is yet to be revealed. When Kowalski floats past the point of view of the (virtual) camera and then around

the Hubble Space telescope only to appear again at the distant end in our field of vision, spectators are sure that the camera—which they recognize as the origin of the view—has somehow participated in this Space walk. Subsequently, the camera offers a view of Kowalski and mission specialist Sharif both conducting EVA and both rotating upside down in relation to the camera's orientation. This is where the dizzy effect kicks in. With the characters' movement, especially the spacewalking Kowalski's constantly spinning and rotating motion, and the seemingly capsized space shuttle, the gaze begins to feel disoriented. The sound, which is designed to appear as if it were coming through the radio transmission, totally deprives spectators of the possibility of locating its source. It takes some time for spectators to confirm who is speaking and who is playing the music, increasing the confusion. The revealing of the Hubble Space telescope against the Earth globe ruptures the sense of orientation: it is no longer clear which is at the down side, the Earth or the telescope. This is exacerbated by the camera's movement minutes later after Kowalski starts to help Dr. Stone at her workstation and jokes about Sharif who is dancing in Space while taking a break. The camera starts upward when Kowalski says "You have to admit one thing, can't beat the view," moving beyond his helmet toward the Earth's surface above the characters (in terms of screen space); it pans slowly toward the right, covering almost half the globe, and ends at the right side of where it started when, out of the blue, Kowalski appears again. This is a visual trick: when the camera tilts up, the characters have switched side, thus definitely disorienting the viewer. Following this, the mission control warns the crew that the potential debris caused by the destruction of a Russian spy satellite has led to a chain reaction that can threaten the astronauts. The camera movement speeds up and follows Kowalski to the bay area of the shuttle to disconnect the Hubble. The camera intentionally mimics Kowalski's movements, such as accelerating, fast falling, and grabbing the rail to stop the free fall. Subsequent to that, the impression of danger in Space escalates when the camera casts sideway (in response to Dr. Stone's warning) to capture the sight of fast incoming debris flying by like bullets. This is the first quick pan and the first sight of blurring objects in the film. The camera then starts a series of reaction movements to locate the floating characters,

following them and flying in between the Hubble, the mechanical arms, and the shuttle.

The ensuing segment is highly kinaesthetic. The camera initially focuses on Kowalski who comes to help Dr. Stone's attempt to return to the shuttle, which is interrupted by a flying piece of debris that kills Sharif. The view of Dr. Stone struggling to detach herself from the mechanical arm is disrupted when Hubble is hit by debris, causing the shuttle to go into a spin. The camera is now detached from the character and the vehicle, remaining roughly at the same location until the spinning Dr. Stone is once again caught in sight. The mechanical arm is now suddenly cut off in the middle, leaving Dr. Stone attached to the upper part that begins to spin violently off the shuttle. The subsequent view fixates on Dr. Stone and tracks in the direction she is moving until it catches up with her and the two start drifting together. The vision remains relatively stable when it is attached to Dr. Stone, but suddenly breaks off when the character detaches herself from the spinning arm. She is sent off toward the dark expanse of Space by the reverse force. The view is accompanied by Kowalski's voice (heard through radio transmission) saying that he is losing sight of Dr. Stone.

Several scholars have dealt with this particular segment and issues related to it. For instance, Adriano D'Aloia has proposed to differentiate between three bodies in the film experience: the character's body, the spectator's body, and the film-body. The character's body is a *quasi*-body for its lack of flesh and blood in the perceptual world (i.e., the characters are not *real* persons as are spectators). The character's body is different from the performer's body although it remains inseparable from it in many ways. The spectator's body is real and sensible, sitting in the movie theater as flesh and blood ("Spectator Involvement" 95). In contrast, the film-body is an idea taken from Sobchack who sees the film as a whole to be a *quasi*-subject (*Address* 167).[14] Therefore, the spectator's engagement with the film can be conceived as a *quasi*-intersubjective relation (191). The key idea here is that what we see in the film is something we see through the film-body's perceiving mechanism. In line with Sobchack's theorization, D'Aloia argues that the spectator experiences space in the film through their empathy for the characters and that this

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[14] Such conception of film-body as a *quasi*-subject is indebted to Mikel Dufrenne who proposes to view artworks as *quasi*-subjects (146).

empathic tie unfolds via the mediation of the film-body. According to him, this empathic connection "is a factor that 'fills the gap' between the bodily presence of the spectator and the bodily absence of the character thanks to the film's *mediation* (in the double sense of keeping separate and putting in contact) between these two lived bodies, even though the character's body is only a *quasi*-body" (98). By conflating the "*bodily expressions* of the character and the *bodily perception* of the viewer," cinema, argues D'Aloia, creates a "shared experiential space" ("Character's Body" 187), establishing a kind of "structural homology" (188).

D'Aloia's approach focuses on the spectator's empathic engagement with the character and aligns the kinaesthetic sensations provoked in watching the film with the empathic connection. Hence, what spectators feel is attributed to the character, completing the *quasi*-body's sensations, which further helps to enhance the emotional power of the narrative:

> On the one hand, we bodily experience the 'detachment' of the astronaut and her drift in space as imbalance, loss, and *suspension*; on the other hand, we experience the 'attachment' of the film-body to the character's postures and movements, offered by the film in order to balance dizziness, to 'ground' suspension, to restore *graspability* and *comprehensibility*. (197; original emphasis)

Thus, the film experience is constantly shifting between detaching itself from the character and attaching to the film-body, which through the empathic connection is in turn established as a re-attachment to the character. Drawing on Edith Stein and Albert Michotte, D'Aloia believes that empathy functions as the mediator enabling spectators to attribute the experience of the film-body to the characters. He also argues that the (virtual) camera's incursion into Dr. Stone's helmet visor where it comes to merge with her point of view on the perceptual level resonates with spectators' empathy toward the character on the emotional level.

D'Aloia's explanation is interesting and persuasive in most places, which I will address toward the end of the chapter, but it does not account for the kinaesthetic aspect of the experience *per se*, especially in moments in the film when characters are not particularly salient. For instance, in the sequence following the fire in the ISS, Dr. Stone manages to get into the only remaining Soyuz spaceship. This segment consists of several relatively long shots of the Soyuz

from an external perspective. Because the landing parachute has been released by mistake, the spaceship is attached to the ISS's structure by static lines (i.e., the fixed cords linking the chute and the ship). Thus, every time Dr. Stone starts the engine, the Soyuz is pulled back violently toward the ISS, resulting in intense spins and rotations. Nevertheless, the spectators' kinaesthetic resonance with the camera movements as well as the movements of the spaceship is equally strong. It therefore reveals that our kinaesthetic experience (such as the feeling of dizziness and balance) attaches more to the camera (or its point of view in the film world) than to the characters. D'Aloia's theory seems therefore less convincing in segments without characters. The problem with D'Aloia's claim is that he may have exaggerated the importance of empathy in enacting kinaesthetic experiences. The spectators' dizzy feeling in viewing *Gravity* is simply not accounted for by their empathic attitude toward Dr. Stone. Instead, dizziness (and equilibrium) manifests itself primarily through perception and the body's immediate response to camera's movements "freed" from gravity.

It is important to distinguish those real camera movements that take place when the film is shot and (virtual) camera movements perceived on screen by spectators. From a phenomenological perspective, I use "camera" here to refer mainly to the latter sense of the term. In this regard, camera movements are not some objects we can see in the film, but rather something construed through various image objects' changing positions in relation to the screen frame. By invoking camera movements, we have already presupposed objects shown on the screen and their movements in relation to the screen frame; otherwise it would be nonsensical to talk about them. When viewing *Gravity*, the change in experience from dizziness to relative balance at the end of the film actually corresponds to the process of restoring our ordinary kinaesthetic orientation on the ground of Earth. The situation of weightlessness and disorientation in Space (especially when Dr. Stone is off structure) is generated through the discrepancy between a constantly floating, spinning, and rotating camera and the static screen frame in the movie theater (where the spectators fixed to their seats are equally static). The movements of most image-objects here have little to do with the disorientatedness felt by the

spectators, because objects' constant movements across the screen do not necessarily lead to such an experience (think, for example, of most superhero blockbusters where things and characters are in constant motion). Rather, only objects serving as background will affect our conception of the camera (and its movements). For instance, if we see the sky as underneath the ground, we tend to understand the camera as being upside down, but that is the case only if we take sky-ground relation as an indicator of a default orientation of up and down. In films like *Gravity*, indicators of orientation disappear because the background is the expanse of universe without any default setting of up and down. In this case, spectators can only resort to camera itself for orientation, since the camera's orientation usually aligns with that of our ordinary perception on the ground of Earth (same with the sky-ground orientation). However, because here in *Gravity* the camera itself is also in constant shift of orientation, we are deprived of any coordinates that we use to orient ourselves. Hence, the lack of a static referential background and the (virtual) camera's changing orientation together are responsible in *Gravity* for the sense of disorientation by creating a discrepancy between themselves and spectators' bodies at rest in the movie theater. The restoration of a sense of balance toward the end of the film is therefore also a resolution of such a discrepancy, an act of realigning the orientation of the camera with that of the spectators (and hence also that of the screen frame).

In contrast to D'Aloia, Scott Richmond speaks of *Gravity* as "adher[ing] us to an *unworldly* world whose alien logic of manifestation thematizes such adherence. [...] this relation of adherence not only encompasses my perception of the world but also includes my perception of myself, my proprioception" (134; my emphasis). He argues that the film "ruptures" our "vestibular sense" and our vision (134). Because this disordering of our vestibular and visual senses goes against our actual senses of gravity and our tactile sense of the theater chair we are sitting on, we feel dizzy. This feeling of abnormality makes explicit our proprioception, or kinaesthetic self-experience. It is *felt* rather than understood.

The resulting anxiety, according to Richmond who opposes D'Aloia's position, is not

entirely due to our secondary identification[15] with the character of Dr. Stone, even though we care about her success or failure in surviving. Even after several viewings of the film (so that we already know the outcome) or when watching sequences where Dr. Stone is not prominently present, we still feel the same anxiety. Richmond concludes that the film "induces anxiety in its viewers [also] through its dissolution of horizontal and vertical axes of perception, as well as the way it displays the human body striving and only barely succeeding to get purchase in the frictionless, weightless vacuum of space, where life is impossible" (138).

Richmond moves away from the characters and objects depicted in the film and redirects our attention toward spectators, and to their own proprioceptive experience. The kinaesthetic, or proprioceptive resonance with the cinematic images helps spectators attune to the film world, and such an attunement at the same time makes manifest cinema's capacity for perceptually modulating the spectators' sense of spatiality and orientation (126). Richmond emphasizes that the space created by *Gravity* is "unworldly" for the spectators because it deviates too much from our ordinary perceptual experience where the ground is fixed and orientations are easily determined. It is true that as earthbound beings, human spectators are not used to groundless space where a frame of reference is hard to find. Although he does contend that the film demonstrates the "incredible plasticity of the human capacity for orientation and orientedness" (122), Richmond does not elaborate on why this deviation can result in such proprioceptive reactions.

What *Gravity* presents is actually a horizon that departs from our ordinary perception on land. The horizon, according to Husserl, is largely enacted through our kinaesthesia. In his lectures and research manuscripts on space constitution, Husserl stresses that "the role played by the body's activity must be considered in any discussion of how a multiplicity of appearances is brought into a synthetic unity such that we recognize them as appearances of one and the same object" (Drummond 20). While we might make mistakes about objects when seeing them from

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[15] Here, Richmond follows Metz's terminology of character engagement based on psychoanalysis. It differs from D'Aloia's phenomenologically inflected theory of empathy in that the latter does not claim a total identification and dedifferentiation between the character and the spectator but rather a resonance of experience with differentiation.

afar, bodily movement reduces such errors and helps establish the spatial relations between the object and its environment. Many enactivist cognitive scientists share such a view. Francisco Varela, Evan Thompson, and Eleanor Rosch write explicitly in their groundbreaking book *The Embodied Mind* about the importance of kinaesthesia in world constitution.

> In a nutshell, the enactive approach consists of two points: (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided. (Varela, et al. 177)

The enactive approach follows the legacy of Husserl and Merleau-Ponty in understanding the genesis and constitution of our world-experience.

> The environment is not a structure imposed on living beings from the outside but is in fact a creation of those beings. The environment is not an autonomous process but a reflection of the biology of the species. Just as there is no organism without an environment, so there is no environment without an organism [...] Cognition is not representation but embodied action and that the world we cognize is not pregiven but enacted through our history of structural coupling. (Varela, et al. 202-4)

From a similar perspective, Alva Noë in his *Action in Perception* argues that "all perception is touch-like . . . *[w]hat we perceive* is determined by *what we do* (or what we know how to do)" (1) and all animals can develop depth perception insofar as they develop the ability to move (13). This line of thinking follows the genealogies of phenomenology and James J. Gibson's ecological psychology (of whom Richmond speaks highly in his book). It has spelled out the essential role of our kinaesthesia's active participation in world-experience constitution. Richmond is right that cinematic experience involves primarily the proprioceptive experience instead of real kinaesthetic involvements because the spectators are fixed to their seats. But such a proprioceptive resonance enacted by the audiovisual information shares the same mechanism with our kinaesthetic world-constitution.

Thus, in viewing *Gravity*, spectators implicitly participate in the kinaesthetic motion of the film-body (via their proprioceptive resonance). Such participation helps instill a sense of space on the part of spectators, which in turn enables them to develop a horizon around what they see and hear. The disorientation that is strange to spectators is gradually absorbed as a normal feature

of the world-horizon in Space while the focus is directed toward more recognizable objects—namely the main character and her actions—to reduce such dizziness, disorientedness, and anxiety.

I expect challenges to this conception of world/space constitution in *Gravity*. One prominent argument appears in Ryan Pierson's essay against the discourse of "camera movement." Since real cameras are gradually replaced by animation in the age of digital filmmaking, Pierson contends that it makes no sense to speak of "camera movement" anymore (7). He uses *Gravity* as an example to demonstrate how a virtual camera is free from the physical laws as it enters into Dr. Stone's helmet visor with ease, while in the diegesis these very laws jeopardizes Dr. Stone's life (7). By giving two experimental examples from the domain of film animation (Norman McLaren's *Blinkity Blank* and Caroline Leaf's *The Metamorphosis of Mr. Samsa*), Pierson contends that such films (including the computer-generated animation of *Gravity*) are forms of filmmaking that can do without camera and world (19).[16] Pierson's conclusion that *some* animated films have completely abandoned the "camera" is right, but this does not however support his argument that *all* discourses on animated films should do without "camera" and "world" (17, 19). Pierson argues that in films such as *Blinkity Blank* and Caroline Leaf's sand-on-glass animations, perspective no longer exists, objects are merely abstractly depicted, and the transformation of figures presuppose no world as their background (14-17).

Even though I am sympathetic to Pierson's view, I feel rather reluctant to agree with him when speaking of McLaren's *Blinkity Blank* and Caroline Leaf's sand animations as worldless. I believe it would be nonsensical to say that we recognize the characters (e.g., Gregor Samsa in Leaf's sand animation), the objects (e.g., the figure of a bird in McLaren's abstract animation), and understand the story to be adapted from Kafka's *The Metamorphosis* without the background of a world, or horizon to comprehend all these. Pierson is essentializing the concept "world" as a concrete perceptual reality. He does not seem to see the virtuality and implicitness of world (or

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[16] Richmond endorses Pierson's position on which he has partly based his argument that we should not talk about the representational aspects of the cinema but should focus on the spectators' proprioceptive experience and it alone (see Footnote 23 in Introduction).

horizon) when the world is not perceptual or not even visible. It is true that neither McLaren's nor Leaf's work conforms to the principle of perspective, hence making it difficult to talk about them in terms of "camera movements." However, their works require a minimal horizon to understand because nothing can be understood without horizon. World as a horizon, instead of world as a perceptual entity, renders it possible to comprehend these animated films. But *Gravity*, unlike these experimental animations, is certainly very different and much closer in important ways to camera-based traditional filmmaking.

Virtual cameras used in computer-generated photorealistic images (which is different from 3D animation in general) should by no means be considered as fundamentally different from embodied cameras for the simple reason that they attempt in every possible ways to imitate and, in some virtuosic cases, simulate the latter. What we see in Cuarón's *Gravity* is a brilliant example where the virtual camera is used to reach beyond the limits of traditional cameras' physical possibilities. The digitally enabled camera achieves physically impossible movements; the syntax set by the scientific footage is pushed beyond its normal boundary. In this regard, it is fair to say that *Gravity* managed a new revolution in the aesthetics of Space exploration. Perhaps in the near future, we will see similar images accompanying live television broadcasts of real Space activities in replacement of the relatively static camerawork of scientific footage, increasing the pleasure and immersiveness of the program.

Nevertheless, the virtual cameras in *Gravity* do not in any explicit manner break away from the imagery created by photographic cameras, especially the latter's visual principles based on perspective, making the film different from animations that deliberately avoid the monocular perspective. In cases where images no longer comply with the principle of perspective (such as McLaren's and Leaf's animations aforementioned), the realistic effect breaks off. What the spectators see will clearly be understood as animations instead of realistic images. For such cases, there is no point in debating whether we should conceive the motions as "camera movements" because there is no camera, not even a virtual one. Moreover, whether there is a camera is a very different issue from whether there is a world. Pierson has mixed these two separate issues

together due to his rather limited conception of "world." Imaginary worlds do not have to be like our perceptual world, and therefore their visual appearances need not conform to the principle of perspective.

Gravity, despite its minimalist narrative, is a fiction film that revolves around an imaginary event. In order to enjoy and to be immersed in the film, we inevitably engage with its characters and its story. Hence, what D'Aloia has demonstrated in his analysis about empathy is certainly an essential part of our film experience of *Gravity*. Because the kinaesthetic resonance in watching the film provides us with a horizon about this unfamiliar world, we are capable of engaging with the characters, the events, and the story. It is this engagement that will in the end offer us the meaning and experience of the film as a whole.[17]

The problem with Richmond's argument about *Gravity*, and in some sense with the larger argument in his book, lies in his decision to dismiss the objects of intentionality in the film, namely the characters, the Earth, the shuttle, the Hubble, the universe, the lake, the animals, the radio transmissions, and the events that take place. By excluding such elements, he tries to argue that proprioception alone (or the experiential aspect of intentionality alone) is able to directly attune spectators to the world onscreen. That is, the film world is not given through the objects shown, but enacted directly through the spectators' bodily sensations. This begs the question: how do the spectators arrive at the world directly from their proprioceptive experience, and what exactly is this "world" Richmond talks about if there is no need to pay attention to the objects in the film? On a face value, Richmond's conclusion seems to concur with enactivist philosophers who argue that the world is enacted through our bodily movements. But on a second thought, Richmond is speaking of something very different. Because film spectators remain seated in the movie theater for almost the entire duration of the screening, they barely move, neither in the real

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[17] Yacavone calls this global meaning the "cineasethetic" expression of the film. In Chapter seven of his *Film Worlds*, he explicates this concept in detail. Following Mikel Dufrenne, Yacavone makes the distinction between the artwork (as the physical object) and the "aesthetic object" (as "the work as and when it is concretely experienced, wherein its full 'sensuous' potential is actualized") (191). He contends that with the proper "aesthetic attitude," we can access the film's "global, cineaesthetic world-feeling" (201), which is realized in "multifaceted temporality of films, as integral to the achievement of such work-embracing expression" (201). The global cineaesthetic experience (or the film's world-feeling) relies on the unity of three aspects: "the relation structure of a work's felt duration, its qualitative affectivity as experienced, and the lived time of the beholder" (213).

perceptual world nor in the storyworld of the film. They can therefore by no means enact a space around them solely through their kinaesthetic sensations. Richmond seems to totally neglect the fact that the kinaesthetic or proprioceptive experience in watching films only emerges when the spectators *see* the movements of the images and objects portrayed. Once spectators close their eyes (and cover their ears), they will feel nothing at all of the film. Actually, all kinaesthetic or proprioceptive experience is evoked and activated by the images the spectators see on the screen. Richmond's dismissal of image-objects altogether leads his understanding of film experience astray. The particular experimental films he has selected for his book (i.e., Marcel Duchamp's *Anémic Cinéma* [1926], Kubrick's *2001*, Godfrey Reggio's *Koyaanisqatsi* [1982], Cuarón's *Gravity*, and Tony Conrad's *The Flicker* [1966]) are all designed to provoke strong proprioceptive experiences in spectators (and perhaps all succeeded in doing so). These cases provide the least persuasive support for his rather general argument that kinaesthetic or proprioceptive experience *alone* (without referring to the objects seen) can enact the world in *all* films. Is speaking of experience possible without referring to the intentional object? I strongly doubt it, and all the films discussed in my thesis can serve as counterexamples, including *Gravity*.

Unlike Richmond, I therefore suggest we take the filmmaker's own statement literally and seriously as it reveals an important feature of world building practices. Alfonso Cuarón offers a view on this particular issue in an interview about the camera's subjectivity in *Gravity*:

> The camera is neither an objective observer nor Sandra's subjective POV—the camera is *a third astronaut*, and that astronaut is the audience. [...] The audience is floating in space, following these characters who are bonded by the loss of physics in zero gravity, floating and rolling and spinning. The idea is to immerse the audience so that your emotional experience is projected onto the screen in a primal way. (Winter 52; my emphasis)

We, as spectators, are supposed to take up the vision of the film as an embodied participant *in* the world even though it is neither a diegetic position taken by a particular character nor the omniscient perspective of an authorial observer. The film-body creates for spectators a position that lies between the diegetic storyworld and the spectators' perceptual world. It takes place in a

liminal space that does not belong in either material spaces, but only happens, as a temporal possibility, in the virtual and potential space of horizon.[18] Not all movements happen in material space. For instance, pure imaginative movements occur neither in the physical space around us nor in any physical representations (such as films). It is wrong-headed to say that they happen in the mental theater (or a "Cartesian theater" as Daniel Dennett calls it). Dennett has pointed out cogently that any mental theater involves a *homunculus* to watch it, while the homunculus's consciousness of seeing the theater involves yet another *homunculus, ad infinitum* (107). Similarly, Jean-Paul Sartre criticizes such a conception of mental representation and calls it the "illusion of immanence" (5), because a mental image is not an image at all; it is *nothing* (7). Imagination or thoughts do not happen in a physical space, but only in a virtual realm, that is the horizon. In his lectures on inner time-consciousness, Husserl proposes that horizontal intentionality is what makes the flow of (time-)experience possible (85). Since any (kinaesthetic) experience has to be in the flow of time, it necessarily takes place in our horizon, a virtual realm. It is exactly in this virtual realm that we kinaesthetically experience the violent spinning and rotating in the weightless vacuum of Space, without our bodies actually moving in the theater or in the storyworld.

This is also the place where the very expansion of our world-experience happens, the very place where our horizon is manipulated. Richmond does not tell us *where* our proprioceptive experience takes place, because his conception of world seems to fall within the dualistic opposition between onscreen storyworld and spectators' ordinary perceptual world. Both of them are worlds of *presence*; they are visible and can be clearly located. The virtual realm of our horizon always escapes our vision and cannot be located. It belongs instead to the realm of temporality. Like thoughts, imagination, and memory, cinematic kinaesthetic experience is real but remains invisible to the corporeal eyes. In short, Richmond fails to see that, besides the

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[18] In a way, I agree with Annette Michelson's argument that the film (she is talking about Kubrick's *2001*) happens "somewhere between screen and spectator. It is the area defined and constantly traversed by our active restructuring and reconstitution, through an experienc of 'outer' space, of the 'inner' space of the body" (64). She is equally right in saying that "[t]he fascination [with *2001*] is not so much in the substance, but rather the adventurous form of experiencing it, the intensity and excitement with which it lets us feel life" (68).

storyworld and the perceptual world, there is also a virtual world where spectators' enacted kinaesthesia (or affect) takes place and expands our horizon. The horizontal virtual space is implicitly given *with*/in our perception. It is neither explicitly *present* in the form of flesh and blood nor clearly *utterable* through language. Horizons are not restricted to either imaginary or perceptual worlds, but are enacted elastically according to our need in the virtual world. Richmond points out that the ability to adapt when watching a film reveals the human capacity for orientation. However, there is more to it than this, for such ability also, and perhaps more importantly, unveils the plasticity of our world-horizon. It discloses our ability to adapt in the virtual realm.

Chapter 3

Space and Home: Between the *World-Picture* and the *Earth-Ground*

> Oh my God! Look at that picture over there! Here's the Earth coming up.
> —— Frank Borman, Apollo 8, 1968

> All animals, all living beings, all beings whatsoever, have ontic being only on the basis of my constitutive genesis and this has "earthly" precedence.
> —— Edmund Husserl, "Foundational" 130

The first human visit to outer space did not take place until October 24, 1946 when a camera that was attached to a captured-and-modified V-2 rocket brought back images taken beyond the Earth's atmosphere (65 miles or 104.61 km above the ground) (Daley). Ever since the surrender of Wernher von Braun and his engineering team to the United States army in the Bavarian Alps on May 2, 1945, the military forces of the United States had been very eager to experiment on the newly captured and even quasi-mythical Nazi weapon and see what it could do (Biddle). During 1946 and 1950, more than 1,000 pictures of Earth came back from the V-2 rockets (Reinhardt). Clyde Holliday, one of the scientists in the research group at the White Sand testing ground in New Mexico where these experiments were carried out, stated in his article for *National Geographic* that these photos showed "how our Earth would look like to visitors from another planet coming in on a space ship" (Qtd. in Reinhardt). At the same time, he predicted "a time when cameras may be mounted on guided missiles for scouting enemy territory in war, mapping inaccessible regions of the earth in peacetime, and even photographing cloud formations, storm fronts, and overcast areas over entire continent in a few hours" (Qtd. in Reinhardt). Holliday definitely saw the possibilities of what could be achieved with this sort of technology that had nonetheless been designed to be one of the most horrifying killing machines at the time—second only, perhaps, to America's A-bomb. The note is interesting in that it points toward diverse applications of rocket technology in the future, while focusing specifically on the possibility it affords us to view our planet (and ourselves) from an external perspective.

Most relevant to my topic in this chapter is what Holliday added to his speculation: "the

entire land area of the globe might be mapped in this way" (Qtd. in Reinhardt). Such a vision was soon to be realized, first in the images of films and other mass media, then in real astronautic explorations. I have mentioned as side notes in previous chapters that almost all films of the Space exploration subgenre utilize the image of Earth as a prominent gesture to show a perspectival shift from and a horizontal expansion of ordinary perception. These include the Earth rising in *Le Voyage dans la lune*, the diminishing globe in *Aelita*, the sun appearing from behind the Earth in *Frau im Mond*, the view of the Earth's surface in *Destination Moon* that resembles the 1946 photographs, and the glowing quarter of the blue Earth as background for spaceships and the spinning Space Station-5 in *2001: A Space Odyssey*. Recent films have more frequently employed images taken from or based on real astronautic activities. The launch footage in *Marooned* is taken directly from NASA's recorded images of Apollo 8, while the almost constantly shown Earth in *Gravity* is computer generated according to available scientific images of the planet. As for scientific explorations, with the successful launch of the first man-made satellite Sputnik-1 (1957), the Soviet Union and the United States soon became involved in the Space Race. When NASA published the famous "Earthrise", a photograph taken during the Apollo 8 mission on December 24, 1968 and named after the recorded conversation between the astronauts who took it (as shown in the epigraph), the dream of taking a picture of Earth/world not only came true merely 18 years after Holliday's speculations, but even paled next to a mission that sent human beings up in Space and for whom Earth could be directly seen from the "outside" by human eyes. Finally in 1995, the fully operational Global Positioning System (GPS) enhanced this technology and our ability to see our home planet from the "outside". It became the first functioning system that practically "mapped" the entire globe ("USNO").

In this chapter, I will look specifically at these images of Earth and Space. The focus will be on how those pictures of our world produced in films and scientific explorations relate to the ideology and the metaphysics Martin Heidegger calls the "world-picture" (*Weltbild*). This is examined against *Gravity* and *Interstellar* to show that a representational conception of Earth is

problematic and might even be dangerous. Drawing on Heidegger and Edmund Husserl, I will also show how these two films, each in their specific ways, engage the issues of world-picture and earth-ground (*Erdboden*). The difference between the content and expressions of the two films leads further to their different attitudes toward the future of human beings, our home planet, and interstellar colonization, some of which are identified as consequences of the ideological lineage that can be traced all the way back to the modern metaphysical premises of the world-picture. One prominent case among these traditions is Nazi imperialism and its direct legacy in the postwar Space Race, in Space technologies and even in the science fiction film genre. Towards the end of this chapter, I will explore in what ways such an ideological legacy is deeply intertwined with (and perhaps even responsible for) the current crises of the Anthropocene, and how an alternative can be sought.

World-Picture (*Weltbild*) and "Earthrise"

In an essay written in 1938, Martin Heidegger addresses one of the fundamental problems of the modern age. He argues that this era is founded by metaphysics, "in that through a specific interpretation of what is and through a specific comprehension of truth it gives to that age the basis upon which it is essentially formed" ("Age" 115). He calls for a reflection (*Besinnung*) on such a metaphysical tendency to represent the essence, the truth, and the world (115-16). In the essay, he points out five areas that are illustrative of such an age: science, machine technology, aesthetics, culture, and the loss of gods. But they are all closely related since they all belong to the modern practice of "research" (*Forschung*) which "must bind itself [in advance] and adhere to the sphere [that science] opened up" (118). The research objects, nonetheless, interact dialectically with the scientific laws (or the plan set out in advance) (120). It at once "accounts for an unknown by means of a known" and "verifies that known by means of that unknown" (120). All those areas of modern research are necessarily founded on their "spheres" (*Bezirke*) or "ground plans" (*Grundrisse*) that are set in advance and will guide the subsequent research activities.

Essential to such activities of research is the tendency of "objectification." Heidegger contends, "Knowing, as research, calls whatever is to account with regard to the way in which and the extent to which it lets itself be put at the disposal of *representation*" (126; my emphasis). Through such representation, "Nature and history become the objects of a representing that explains. [...] Only that which becomes object in this way *is*—is considered to be being" (126-67; original emphasis). That is, representation substitutes the objects *per se*, and comes to be understood *as* being itself. Heidegger argues that if such a conception of science as research is essential to the modern age, the age must have already been grounded in such metaphysical ground plans (127). What we seek turns out to be exactly what we have put there in advance.

Heidegger understands that such ground setting is laid out in the form of a "world-picture" (*Weltbild*). The "world" in this very concept refers to the "totality," a projected entity that encompasses literally everything, while "picture" means "a copy of something" (128). Hence, the world-picture is a "painting" of "what is as a whole." Moreover, it also points to the world itself as such, something "normative and binding for us" (129). Paradoxically, as we talk about the world picture, we are part of the picture.[1] The conclusion can thus follow: this particular way of inquiring into the world picture is an essential feature of the modern age, yet it is not at all possible to have such a world picture (130).

The performance of representing something entails presenting something at hand (*vorhanden*) before oneself; it implies also someone who receives the representation (131). Thus begot the subject who represents and receives the representation. "Man becomes the representative [*der Repräsentant*] of that which is, in the sense of that which has the character of object" (131).

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[1] Markus Gabriel proposes a similar argument in his *Why the World Does Not Exist?* where he shows that the paradox of talking about world and being part of it excludes the possibility of an entity of world as a whole. That is, there cannot be a sphere called world that encompasses everything because the very act of talking about it contradicts the statement. However, "although the world does not exist", contends the author, "there do exist infinitely many worlds, which in part overlap but are also partly independent of one another" (65). This is crucial for us to understand the world-horizon as one of the many "worlds," instead of some "closed totality" (65). Nonetheless, Husserl's account of the world-horizon or the total-horizon is somewhat more complicated since it is pre-given to our experience as an a priori *form* that is open to the particular and the historical instead of a closed totality that stays static and includes everything. See Walton, "Die Lebenswelt" for more on Husserl's conception of world-horizon in his research manuscripts.

What is decisive is that man himself expressly takes up this position as one constituted by himself, that he intentionally maintains it as that taken up by himself, and that he makes it secure as the solid footing for a possible development of humanity. [...] for the purpose of gaining mastery over that which is as a whole. (132)

[T]he more extensively and the more effectually the world stands at man's disposal as conquered, and the more objectively the object appears, all the more subjectively, i.e., the more importunately, does the *subiectum* rise up and all the more impetuously, too, do observation of and teaching about the world change into *a doctrine of man*. (133; original emphasis)

The position of (hu)man here is conceived as a "world view" (*Weltanschauung*), which human beings have taken up to preside over other points of view. The world picture can thus be seen as a "structured image" (*Gebild*) created by humans. By doing so, humans "contend for the position in which [they] can be that particular being who gives the measure and draw up the guidelines for everything that is" (134). Thus, by taking up the perspective that is secretly put there as the "objective" standpoint, human beings have made themselves the "subject" to look. As science becomes an act that turns things into representation, the world is no longer experienced but almost always represented in the form of a picture. It becomes a "system" set before humans who self-recognize themselves as *subiectum*, or a subject (129).

Two aspects from Heidegger's thinking are essentially relevant to my discussion. First, in the modern age, the world is turned into a representation, a "picture." Second, by doing so, human beings have sought to acquire mastery over the world. Therefore, going back to the world-experience becomes an urgent matter, not only to re-connect us to the world (as horizon) but also to withdraw ourselves from such a privileged position as that prescribed by the metaphysical ground plan.

I will start with world as representation. It is important to note that by "world-picture," Heidegger by no means refers to any actual pictorial depiction, not to mention a physical picture of the world/Earth. What he means is that the world (as a totality, a sum of everything) has been turned into a representation. I am here going to use this concept more broadly and try to show how such physical pictures of Earth contribute to and consolidate our representational conception of the world. The process of turning the world, or the place where we dwell, into a picture has

been going on long before the modern age. It had not, however, dominated our public opinion until modern science came to occupy the center stage. Human beings have for a long time preoccupied themselves with the work of representing the world, from the primordial cave paintings in Chauvet, Lascaux, or Altamira to the earliest maps discovered around Pavlov in the Czech republic and Spanish Navarre. But not until the early modern times did these techniques of representing the world transform into something of a system, something conferred with absolute objectivity, something conceived as even truer (and more objective) than our world-experience. Prior to the time of Nicolaus Copernicus, it is difficult to see the Sun as the center around which our earth (i.e., the ground)[2] travels, not because people were blind but because they had not developed the method of representing the world as a picture yet.[3] The world was not yet represented; what had been painted were pictures of objects *in* the world. Therefore, despite the long history of representing worldly objects, the *attempt* to represent the world *as a whole* is relatively new.

Such a metaphysical conception of the world is not at all unfamiliar. As I have mentioned, it usually involves the form of a literal picture of the Earth planet. We have learned from modern science that Earth is but one of the planets that revolve around the Sun which is in turn part of a much bigger galaxy and the universe. But this knowledge is not always understood in the same way we learn how to ride a bike or how to swim. Moreover, even if we watch the stars in the sky everyday with our telescopes, we are not able to arrive at astronomic theories directly from our observations. Most times, we look up at the sky with some astronomic knowledge that we have already acquired independently. Primary and secondary education as well as astronomical societies around the world promotes knowledge about what we can see in the sky in any particular season. Nowadays when we do such observations, we do them according to the plan, such as a night sky guide for enthusiasts.

A funny recent event is revealing. On March 20, 2018, an astronomy professor from the

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[2] The capitalized Earth is deliberately distinguished from the small lettered earth. Whereas the former indicates the planet as a representation within the scientific discourse, the latter refers to the ground we feel intuitively. The distinction will become clear as I proceed.
[3] With Copernicus, the method of representing the world is fundamentally mathematics.

University of Cape Town published his discovery of a bright new celestial object on *The Astronomer's Telegram*, only to find out 40 minutes later that he actually mistook Mars for an unknown star. The official twitter account of *The Astronomer's Telegram* jokingly awarded the professor a certificate congratulating him on discovering Mars.[4] The hilarious mistake can help lay bare the mechanism of modern scientific research. New research activities always presuppose previous maps. When the representational maps/ground plans are not rigorously taken up, mistakes happen. My point in invoking this event here is to show that the modern research attitude replaces the researcher's intuitive response, and the latter is no longer trusted without the help of a preconceived scientific map. The presupposition of a representation, a picture of the world nowadays usually precedes our activities of discovery.

The same thing happens when we encounter pictures of Earth. When the pictures are shown, be they painted or photographed, modern viewers spontaneously come up with the horizon proffered by modern science according to which Earth is a planet that revolves around the Sun, as a tiny little speck in the vast and endless ocean of stars. What I want to emphasize here is not the image of Earth *per se*, but what this image entails. It is the background, the horizon for the image that matters. The very act of seeing Earth as a whole as an object out-there differs so sharply from the experience of living and standing on the earth right-here. For most people today, a point of view from outside Earth cannot be comprehended in terms of our experience, but only remains as a speculation, a pure intellectual product. Hans Blumenberg calls this particular kind of experience "astronoetics", as opposed to astronautics (*Vollzähligkeit* 548). The activities of astronoetics refer to the general intellectual contemplation of the cosmos without really going there, and these activities have been going on for thousands of years in human history. Such speculation and calculation gradually became in the modern age a subject that was given rigorous considerations based on the mathematical formalization of the world, a form of representing the world as a picture. This process as part of the general project of scientific research has made modern astronautics possible. As a result, the sky finally came closer.

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[4] The news can be found on many news sites. My source comes from *Science Alert* (Bowler).

Especially with the advent of modern rocketry and other astronautic technologies, our experience of the world changed. A ground-based horizon was somehow replaced by a scientific perspective from somewhere outside the universe. People started to view the earth as the Earth *planet*, and as a result, the horizontal consciousness shifted from a centrifugal movement to a centripetal one. That is, the world-experience based on our own sense of space made way for the sense of our *position* in a preconceived world-representation. Whereas our forebears arrived at the world-horizon as the vanishing point of their vision, we are now directly taught by scientific theories the horizon, as in the case of the Big Bang theory. In a reverse order, we now start with a scientifically established map and then come gradually back to ourselves as a point on the map. The practice of positioning ourselves relative to the globe (through such devices as Global Positioning Systems) is one of the most prominent examples of the replacement of world-experience by world-representation. The process of coming to understand the world around us gives way to the process of determining where we are (i.e., the location) on a pre-given map, the world-picture.

This tendency to represent the world can be witnessed in early SF films as well. Méliès, Protazanov, and Lang all seem to rely on such an idea of Earth as representable and objectifiable in terms of the astronomic map of the universe. Even if they are simply using these images as an indication that the characters have left Earth, our ability to understand such indications necessarily entails the logic of modern science and that of the world-picture. The intriguing images of Earth as a globe in all those films implicitly mobilize the scientific way of looking at the world. However, once represented and frozen in the film frame, Earth loses its nature as horizon such as we usually entertain it as the background for perception. Instead, Earth itself becomes yet another object for our observation, just like the specimens under the microscope in a biological laboratory. The danger of the world-picture is that we, who have not gone to outer space, might forget that this is a representation derived from theory, not something we embodiedly experience. The absence of perceptual and sensory experience outside Earth in real life hinders us from grasping these images of Earth as *literally* seen from outside the planet. That

is also why I argued in Chapter two that films made prior to the Apollo missions could not be properly called "embodied science fiction realism." It is not cinematic technology that prevented them from becoming realistic SF films; it is rather the absence of a real astronautic horizon (the fact humans had not yet been to outer space) that constrained these films as fundamentally speculative.

Figure 3.1 "Earthrise" ©NASA.

With the first picture of Earth coming from the camera on a V-2 rocket in 1946, people started to reconfigure what they had in mind when thinking about Earth. Only after that, did the idea of Earth as a globe became something almost tangible, solid, and intuitable, something more than a diagram: these images even offered a *quasi*-embodied feeling about the Earth globe. The

truly mesmerizing moment took place on Christmas Eve, December 24, 1968 (Eastern Standard Time or UTC-5) during the Apollo 8 mission. The astronauts—Frank Borman, Jim Lovell, and William Anders—broadcasted live what they saw from the spacecraft: the Earthrise from the Moon's horizon (see Fig. 3.1). This was the first time that we earthlings managed to occupy the point of view of the Moon and looked back at Earth from the outside. Certainly, the experience for the three astronauts was different from that of the audience in front of the television sets. But through the very media of photo-electronic moving images, the horizon of the spectators can be said to have expanded along with that of the astronauts.

In this picture of Earth with the Moon's surface in the foreground, something peculiar happened. For this is not merely a picture of Earth, but a picture of our planet within a certain horizon and from a certain point of view. What is seen is understood as really happening in an embodied space, and not merely another picture in the long series of speculative depictions. In a sense and for those who lived that moment, the experience of seeing the picture of "Earthrise" resembled that of seeing oneself in the mirror for the first time: suddenly, what was invisible to the self is for the first time made visible.

Benjamin Lazier in his 2011 essay, which serves as a great inspiration for this chapter, also understands Heidegger's concept of the world-picture by evoking these early photographs of Earth and the impact they exerted on us. Drawing on Hannah Arendt, Hans Blumenberg, Husserl, and Heidegger, Lazier considers Heidegger's conception of modern astronautics a little too pessimistic since the latter fears that the modern age necessarily involves the reduction of the world-horizon to a mere representation and the reduction of the earth as ground to Earth as "merely [an] astronomical idea of a planet." Heidegger fears that the earth-ground (*Erd*) will be replaced by the Earth planet (*Erdball*) (*Pathmarks* 183-230; Qtd. in Lazier 611-12). Lazier follows Blumenberg's reflections in contending that "photographs of Earth [are] different from their astronoetic predecessors" (622). He uses the example from Jules Henri Poincaré who asked whether the Copernican revolution would have been impossible if Earth were constantly clouded and no one could ever see the stars and the Sun. His own conclusion was simple and clear: No.

The Copernican revolution was destined, not because of our sensory and optical experiences, but because of mathematics and physics. Copernicus's success is built on the fact that he is neither an astronomer nor an observer, but a mathematician and a physicist (622-23). Following this, Lazier concludes forcefully, "Heidegger worried that thinking globally precluded being locally. The Earthrise era, Blumenberg thought, would enable us to do both at once" (623).

Hence, the proliferation of "Earthrise" and of other pictures that followed—especially the 1972 "Blue Marble" taken during the Apollo 17 mission—have changed the world-experience for ordinary Earth dwellers who have never travelled to outer space. These images not only expanded our horizon of the world, but also brought us back to earth, and in many instances to caring for our home. The mirror effect made us aware of ourselves and of the place we have been living in (especially the ecological sphere that we are part of). Now we come to understand that our home can be endangered (e.g., that ecological disasters are true and possible). In this sense, "[e]ven if Earthrise was picture first, experience second," argues Lazier, "it could still prompt a transformation: a return to Earth by way of the rise of Earth in the pictorial imagination" (625-26). But before going into issues of caretaking, I would like to linger a bit longer on the destructive side of the world-picture. Self-awareness is precious, but it always comes one step too late. Space exploration cinema of the SF genre and real Space programs played yet another role in the process of this horizontal shift.

From V-2 to Saturn-V, From von Braun to Nolan

This section will first address the second aspect of Heidegger's thinking in the world-picture essay and then bring the two aspects together with the help of *Interstellar*. In addition to reducing world-experience to world-representation, the very logic of the world-picture entails the idea that the world is represented *to a subject*. The representation of the world is always accompanied by the birth of the *subiectum*, the subject who makes and receives this representation. The emergence of the *subiectum* gives rise to the split of subject and object. Hence, the process of reducing things (*Dinge*) into *objects* (as representation) always comes

along with the process of raising ourselves, as subjects, to a position where we have mastery over objects. The peril is immediate, as I will explicate in the following.

Let us rewind our time line and return to Lang's *Frau im Mond*. The film paved the way for a long-lasting debate on the style and form of Space exploration SF cinema. Many contemporary (leftist) critics saw it as "old-fashioned and backward looking," especially for its "reactionary mawkishness" (Gunning and Loew 566). The position was established so as to counter the right wing, nationalistic, anti-democratic ideologies pervasive during the Weimar republic. Some even deemed Lang and his work to be a "remnant of the Wilhelminian era of film history" (567). While Siegfried Kracauer also criticized Lang for his "Nazi aesthetics," others believed this accusation oversimplifies what is ambivalent in the film (Gunning and Loew 571).

I subscribe to Gunning and Loew's interpretation: the ambiguous ending thwarts any one-sided view of the film. The evil cartel representative and the greedy scientist are both killed, while Windegger (Gustav von Wangenheim) is punished for his cowardice by losing Friede's (Gerda Maurus) love. The wished-for union of Helius and Friede not only satisfies the appetite for the story logic of good-man-deserves-reward (as both of them admirably sacrifice themselves), but also celebrates the Romanticist spirit embodied in rocket science. What appears to be a story about "a futuristic gold rush" (556) is actually a reflection and even a critique of such an expansionary and conquest-thirsty tendency resulting from the combination of capitalism and ultranationalism.

However, the Nazi ideologies of expansion and conquest are also latent, intertwined with the Romanticist ideal to achieve superhuman potency—the ability to escape gravity and to see what human vision cannot perceive is on a par with the ability to produce technologies that serve conquests and colonization. For one thing, the vision of aerial photography, a combination of photography and rocketry, anticipated the use of cameras attached to V-2 rockets that would later bring back the first picture of Earth. For another, the theft of Helius' rocket plans and documents by the cartel in the storyworld forshadowed the later real-life, secret employment of rocket engineers, such as Wernher von Braun, by the Nazi regime. It is undeniable that *Frau im Mond*

played an important role in the development of Nazi's V-2 rockets. Not only did von Braun admit the film's influence on him, but as we saw earlier, he also directly alluded to this lineage by symbolically adding a *Frau im Mond* logo to his first successfully launched rocket (Hardesty and Eisman 2).

Michael Neufeld in his biography of von Braun defends the leading engineer of the V-2 rocket and regards him as an "apolitical" enthusiast for Space travel (*Von Braun* 55). Interestingly, Neufeld adds that, according to Willy Ley, von Braun was "indifferent to party politics but comfortable with his father's values" (55). Magnus Freiherr (baron) von Braun, father of Wernher von Braun, a descendent of a well-established Prussian noble (*Junker*) family, was once a member of the Nationalists and served as Weimar minister at the beginning of June 1932 until January 28, 1933. Even though von Braun's father was not directly involved with the Nazi regime, he was hardly apolitical. Despite various defenses for his indifference toward politics, Wernher von Braun's passion for Space travel and rockets necessarily involved political acquiescence during both the Nazi era and the Cold War Space Race. As both Neufeld and Biddle have uncovered, this "dreamer of space" was fully aware of the use of slave labor at the rocket plant Mittelwerk in Thuringia (Neufeld, *Von Braun* 160; Biddle). According to the testimony from Guy Moran, one of the prisoners who were forced to build the rocket and found to have "sabotaged" its construction when von Braun (who was a member of the SS himself) visited the plant, the latter "ordered the [supervisor] to have [the prisoner] given 25 strokes in his presence by an[other] SS who was there," "[w]ithout even listening to [the] explanations" (Biddle 124-25). Robert Cazabonne, a survivor from the Mittelbau-Dora concentration camp, who was also forced to work in the rocket factory, witnessed that some of the chained "saboteurs" were "hanged from hoist" (125). Among the onlookers, he reported, was von Braun (125). But of course, as von Braun's team member Konrad Dannenberg recalled when asked if von Braun ever objected the forced laboring, "If he had done it, in my opinion, he would have been shot on the spot" (Roop).

I do not want to go into too much detail about the debate on whether von Braun should be

held responsible for the deaths caused by the construction and use of the weapon. It is undeniable that for von Braun the passion for rockets is more important than other people's lives. Notwithstanding such ethical problems, the U.S. government recruited him anyway to lead the first Space programs after the Second World War. Von Braun, who might have cared little about politics, always worked as an essential engineer for political powers in their efforts to counter the enemies, first for the Nazi against the allies, then for the United States against the Soviet Union. These seemingly different experiences of cooperation follow the same logic, that of the world-picture. It can be identified in two of von Braun's post-war achievements whose influence are considered to be worldwide and remain strong for almost all Space programs today.

The first of von Braun's most well known achievements in the U.S. is the Saturn-V rocket, the model that served the Apollo 11 mission. It is a massive construction that can send 140,000 kg (310,000 lb) of payload to the LEO, a record holder since its first successful launch in 1967. The shadow of this giant can still be felt today on Space exploration. On February 6, 2018, Elon Musk's Space Exploration Technologies Corporation, known as SpaceX successfully launched the Falcon Heavy rocket, a heavy-lift launch vehicle that aims for future transportation to Mars, a goal much resembling, and even emulating, that of Saturn-V. While SpaceX's now mature technology of recycling first stage rocket boosters might be considered a concrete step forward in modern rocketry, the Falcon Heavy is much less impressive than its illustrative predecessor. The rocket is almost entirely based on the Falcon 9 model; it consists basically of a strengthened Falcon 9 first stage as the core and two additional strap-on boosters.[5] The achievement is a result of a desire for the quantitative gigantic. The desire calls for the ability to lift heavy objects off the ground (against gravity) and the ability to travel unthinkable long distances in the universe (against humanity's existential scale). If Lang's presentation of Space technology still bore the Romanticist inflection of overcoming the human, von Braun's and Musk's wish is to turn the human into a superhuman that can master cosmic objects and defy the

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[5] According to the company, an even larger vehicle will follow. It will be a super-heavy lift launch system called the "Interplanetary Transport System (ITS)"and will be able to send a payload of 300,000 kg to LEO. The rocket system is currently under development and is expected to be functional around 2024 (Chang).

forces that tie the human to the earth.

The other influence is less well known today, but equally pervasive. During the 1950s, von Braun published a series of articles in *Collier's* magazine. Besides von Braun, Willy Ley, one of the oldest members from VfR, was also among the contributors, and Chesley Bonestell, who contributed to the production of *Destination Moon*, designed the illustrations for most of these articles. The series is titled "Man Will Conquer Space Soon!" These articles further served as the basis for a three-episode Disney animation series for *Disneyland*: "Man in Space" (1955), "Man and the Moon" (1955), and "Mars and Beyond" (1957) (*Tomorrow Land*). Among them, "Baby Space Station," co-authored with Cornelius Ryan, "Crossing the Last Frontier," and the episode of "Man and the Moon" introduced the idea of a wheel-shaped Space station that would generate gravity by propelling itself into a spinning motion. The idea ended up in Stanley Kubrick's *2001: A Space Odyssey* and its now iconic Space Station 5. Similar traces of influence can be found in recent films such as Station Elysium in *Elysium* (2013) and Station Cooper in *Interstellar*. In other articles, von Braun also envisaged the journey to the Moon and the interplanetary travel to Mars. The latter project found its way into a book that was published in the same year, *The Mars Project*. In the book, von Braun proposed a 70-person Mars expedition consisting of a fleet of 10 Space ships of a 39-ton lift capacity and he calculated that the journey to Mars would take about 260 days. All details for the expedition from departure to landing were delineated (viii). Prominent among all these publications is the idea of conquering Space and even colonizing other celestial bodies, such as the Moon and Mars. Elon Musk, in parallel, is one of the most stubborn proponents of such a grand project today. Colonizing Mars is one of the major goals and reasons Musk founded SpaceX (Chang). The Falcon Heavy mentioned above is simply a step in a much more ambitious project. The company has developed systematic plans for the colonization, the transport system (e.g., the "Mars Colonial Transporter"), the self-sufficient Mars base and city, the life-supporting system, etc. Musk envisioned at the 2016 International Astronautical Congress in Guadalajara, Mexico, that SpaceX vehicles would take "100 passengers on the journey to Mars, with trips planned every 26 months, when Earth and Mars

pass close to each other," and it would take "40 years to a century" to build a self-sufficient city on Mars (Chang).

These two influences are illustrative of the logic of the world-picture, especially how human beings, by turning things into objects, seek to take control of the world. The greater power of the interplanetary rocket comes hand in hand with the greater ambition to conquer. As we have seen towards the end of World War II, the V-2 rocket of the Nazi regime and the atomic bomb of the U.S. demonstrate the fiercest power of destruction that human beings had ever created. Both weapons signalled a huge leap in terms of scale: the unprecedented distance and speed the rocket could travel and the unbelievable destruction the bomb could cause. Alongside other weapons of mass destruction, such as chemical and biological weapons, these human inventions are not side-products of a grand project, but are themselves the manifestation of the catastrophic power of the logic of the world-picture. Von Braun might have had in mind a greater plan that would have benefitted human beings in the future, but the plan itself was problematic and its realization has proven itself to be murderous. If von Braun believed that almost everything could be sacrificed for his final project, seen as a prospective greater good, what was this greater good? No one can be so sure. Von Braun, his colleagues, and many other enthusiasts following him were indeed passionate about the task they have been carrying out. Yet the very *raison d'être* of the project remains ambiguous, whether it was simply an act of curiosity, a gesture of "dare to know," or something else was never elucidated. Neither von Braun nor Musk has pointed out exactly what they are up to, yet they are pretty sure about the process of executing such a grand plan: human's colonization of outer space.

This is the illusion of mastery the world-picture has offered. The position of the *subiectum* demands the deed be done while the project of turning the world into a representation promises an empty reward. If I may invoke another essay by Heidegger here, he identifies *technê*, or technicity, as what is really taking control in such instances. "[T]he essence of technology," claims Heidegger, "is by no means anything technological" (*Question* 4). All technological activities do not serve the human but the very essence of technology, which he calls "enframing"

(*Gestell*) (20).

> Enframing means the gathering together of that setting-upon which sets upon man, i.e., challenges him forth, to reveal the real, in the mode of ordering, as standing-reserve. Enframing means that way of revealing which holds sway in the essence of modern technology and which is itself nothing technological. (20)

When people believe that with the help of technological development they are finally in control of their fate, technology has only just revealed itself as the arbiter of human destiny. The modern age has provided technology with an absolute control from the moment we have given up the world-horizon for a world-representation, a world-picture. Human beings become in the process the "standing-reserve" (*Bestand*) that carries out the will of technology. Enframing is the world-picture being realized so that the so-called objectivity can encroach and enslave living beings, or the Being-in-the-world (*In-der-Welt-Sein*).

In terms of film history, what was portrayed in the early Space exploration SF films not only anticipated real histories outside cinema but also impacted on future films of the subgenre. While the Nazis carried out part of *Frau im Mond*'s story in reality and the U.S.-Soviet Space Race actualized what was depicted in *Destination Moon*, later films belonging to this subgenre have, to this day, carried along and largely retained their techno-oriented world building practice. As a result, many contemporary SF cinema of Space exploration inherit both the embodied method (in terms of both expression and content) and the logic of the world-picture behind modern astronautic activities.

The logic of the world-picture is most evident in Nolan's *Interstellar*, embodied in the escapist theme that runs throughout the film and in the ending where humans begin to colonize a distant planet. *Interstellar* as a whole, I will show, is more complicated, but it portrays well through the characters professor Brand (Michael Caine), Dr. Mann (Matt Damon), and even Cooper in the first half of the movie, the very logic that Wernher von Braun and Elon Musk share.

The World-Picture in *Interstellar*

In the first part of the film, Cooper's meeting with the teachers of his children does not go well and he gets Murphy (Mackenzie Foy), his daughter, suspended from school. Returning home, he sits on the bench in the front porch of his house with his father-in-law and complains about the times he lives in, a time when the world no longer needs engineers (like him) but farmers, because the ecological situation is causing food shortages. He mumbles something about how people tend to look down to the ground instead of looking up to the stars, as they used to do. What he believes is essential to humans, but that others have forgotten, is that we are "explorers, pioneers, not caretakers."

Cooper's line, integrated with the great Mid-Western setting (the scene was actually shot in Alberta, Canada) the film begins with, strikes the chord of an admirable spirit of mankind. But this chord, despite its heroism, is deeply entrenched in the ideology of "man-"kind. The "we-are-not-caretakers" string attached to the line reveals one of the most serious problems that modern men face: the usually dismissed and even disparaged value of nurturing. Cooper's manly character sets the stage for the entire film and serves as the momentum that drives the ensuing plot. His depreciation of the "feminine" side of life, shown in his earlier conversation with the school teachers, will be a mainstay of the plot until the crew receives the video message of a grown-up Murphy (Jessica Chastain). By then, the expedition team has left the Solar System and started travelling in a distant galaxy. In the video, the already middle-aged daughter accuses her father of abandonment. By pursuing his masculine ambition to explore and pioneer, Cooper fails in his duty to take care of his children, the nurturing task belittled by the patriarchal values. The sight of his daughter, who has caught up in age with Cooper thanks to the laws of spacetime, shocks Cooper who, though he knew the astrophysics well, only now experiences its effects for the first time. A world-representation suddenly takes the form of a world-experience. This shock not only derives from the sublimity of such laws' effect, but also emerges as a feeling of guilt for his abandonment of his daughter. For spectators, the departure sequence where Cooper promises Murphy that he will soon return home occurs little more than an hour in the past. Cooper tells

Murphy that when he will return they will be the same age due to the relativity of time. Here, the law of narrative time intensifies the law of relativity in astrophysics, bringing with it the unbearable weight of regret. Only when Cooper comes back from the Miller planet of water and faces his grown-up daughter in the video message does he finally realize the sacrifice he has made in order to pursue his manly ambition as well as the mistake he has committed by failing to carry out his responsibility to nurture. The sorrow is only made more unbearable by the loss of a crewmember Dr. Doyle (Wes Bentley) and the time wasted on an uninhabitable planet where an hour amounts to seven earthly years.

Interestingly, the first video message of Murphy comes right at mid-point in the film, exactly at the moment where, according to many screenplay gurus, the protagonist "tries something new, takes control of his or her own destiny in a way that has not been done before" (Qtd. in Bordwell 29). At this moment, a decision has finally been made by the protagonists to battle the antagonist (Bordwell 29). In terms of *Interstellar*, the bad guy is first revealed here as the Cooper of the first half. Here, self-recognition leads to a race with time, both at the level of the narration (in the form of a speeded-up rhythm) and at that of the storyworld (in the form of astrophysical time-dilation). The emotion escalates again when Cooper and the team land on Mann's planet and receive a second video message from Murphy pronouncing the death of professor Brand and disclosing that Plan A was a sham. The revelation of professor Brand's lie sends the latter third of the film into a very different direction. It functions as the tipping point at what again many screenplay gurus believe to be the "darkest moment" in the narrative: the end of Act 2 and the start of Act 3 (Bordwell 29). Following that, the problems are gradually resolved in the remaining part. Contemporary films, as Bordwell cogently argues, have inherited this conventional three-act narrative structure of the classical Hollywood cinema (28). Act 3 is typically made up of the continuous moments of a "ticking clock" (29), which we see in *Interstellar* as partly an act of revocation of what professor Brand and Dr. Mann stand for and partly an act of repentance for a possible salvation for Cooper.

The effect of this series of shocks is twofold. On the one hand, Cooper's realization of his

own betrayal of his daughter urges him to finish the trip in time so as to save Murphy and reunite with her. Although he succeeds in the end, the sacrifice is such that it will never be fully compensated. On the other hand, Cooper finds out that professor Brand's Plan A to save all the people on Earth and transport them to new colonies is but a sham leading to the execution of Plan B in which only human embryos are kept safe and brought up to rebuild a human society in new colonies. His indignation at the discovery of this scheme results in his adamant insistence on carrying out Plan A in addition to Plan B. It responds to the call of duty the shock has sparked. As a result, both the escape from Earth and the abandonment of his family appear finally justified by the act of rescue.

Although the film certainly complicates matters by having Cooper and Dr. Brand (Anne Hathaway) denounce Plan B, Nolan seems to hold the eco-disaster on Earth as something irreversible, which is what leads to the idea that human embryos *alone* will restore a human society, one without plants, animals, or any other earthly elements.[6] I do not want to ask too much of *Interstellar*, its conclusion shall hopefully never be the future of our world, for what is lost here is not only the planet Earth, but also the ground of earth, the nurturing side of life. The resolution offered by the film is ambiguous but it is clearly problematic to believe that Earth must be abandoned, sooner or later, a view confirmed in *The Hollywood Reporter's* "In Focus" interview with Nolan where he expresses his personal take on leaving Earth as a necessary step in the future. The problem is that neither Plan A nor Plan B conceives of human beings as part of the earthly eco-system; they unambiguously share the belief that the human species is unique and can restore a living environment for humanity independent of any other species or earthly organisms. Similarly, the disastrous sandstorm is considered in the film purely as the deed of some malicious devil, as if unrelated to human activities. Humanity's responsibility for such eco-disasters is almost totally obliterated from the narrative.

By adamantly executing Plan A, the film ends with an ethical note as the majority of living

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[6] It is mentioned by Dr. Brand that plan B does entail the issues of diversity, but it merely concerns humans. Nothing about other Earth-dwellers is given a slice of thought. The message embedded is therefore devastating: the entire project is about saving humans as a species and nothing else, as if human beings emerged out of nowhere and had always lived independent of anything else.

humans left on Earth are saved, and thus antagonizing professor Brand and Dr. Mann, as well as their distanced manner typical of a certain scientific positivism. However, this resolution simply replaces one problematic view with another. Both plans, in the end, revolve around an anthropocentric bias, a belief in the uniqueness of humanity, and a speculation regarding the human species as independent of the relational networks of Earth.

The film ends with Cooper saving the people remaining on Earth by sending out the quantum data collected from the gravitational singularity inside a black hole. He is then saved and reunited with his now dying daughter, who has by then become a renowned physicist by solving the conundrum of gravity. The scene of the reunion is rather brief (no more than two minutes of screen time), in which Murphy quickly dismisses her father as if all the past mistakes had been forgiven and life had carried on much better without him because now she has a huge family to accompany her. This time, Cooper is asked by his daughter to leave for the reason that Cooper should stick to the role of frontier explorer he has identified with since the start of the film. The narrative has come full circle only to return to a line Cooper spoke at the beginning.

"He's prepared to destroy his own humanity in order to save the whole species. An incredible sacrifice," says Dr. Mann of professor Brand. Now, we are meant to understand that Cooper is different from them because of the choices he makes. But exactly how different is he? If we recall the conversations in the first half between Cooper and professor Brand, we will notice that both plans actually entail the same problem. First of all, the plan (B) of leaving the living beings behind and restarting on an alien planet some new human civilization is already inscribed into the project's name. During the first visit to NASA's secret facility, professor Brand tells Cooper that the mission is called "Lazarus" because Lazarus came back from death, to which Cooper immediately responds, "Sure, but he has to die in the first place." The characters and spectators come by the meaning of this interchange only when Murphy's message announces that Plan A is a sham after she confirms it with the dying professor. Cooper must have noticed traces of the secret in the name of the mission though he did not understand it fully. Hence, what Cooper regrets is not only his abandoning of his daughter and son, but also the fact

that he did not fully understand professor Brand's scheme. He, judging from the narrative as a whole, is also a victim, a victim of professor Brand's lie. Following this logic, Cooper might not have chosen to take up the mission but to stay with his family on Earth.

But on second thought, this is not true either, for Cooper expresses explicitly his ambition of going up to explore and his contempt for farming. His behavior toward the school teachers is evident of this. When the principal tells him that his son Tom (Timothée Chalamet) may have to become a farmer in the future because his score is not high enough to get into university, Cooper laughs at the principal and ridicules the policy. His response to the female teacher is somewhat similar. He uses his deceased wife as evidence to refute the teacher's claim that all Space programs are a waste, blaming the cancellation of Space programs as the cause of the medical inability to cure his wife's disease. Neither of his responses seems rational and appropriate to his own status as an engineer. Instead, they are grouses about not being able to actualize his manly ambition. The film gives us the sense that Cooper has resolved his inner conflict by saving his daughter and the people on Earth, which seems to be confirmed by his dying daughter when she answers "I know" to Cooper's explanation that he was her "ghost" all along and therefore it was he who saved humanity. Yet Cooper's hubris is such that he mistakes "Station Cooper" to be named after him, while actually it was dedicated to his daughter. It is evident that Cooper believes by the end of the film that he has paid his debts and cleared his guilt. In fact, Cooper does not come to understand that his initial ambition is equally problematic.

At stake with this ambition is a desire to conquer the universe, to colonize alien planets, and to leave our home Earth, a desire whose inherent logic is that of the world-picture. Professor Brand has displayed this logic well in one of his speeches, "We will think not as individuals, but as species." This species-mode of thinking is a way of treating things as representations. By thinking as a species, one no longer relies on his/her own experience but puts the faith on an external picture, especially the mathematical way of thinking. The human being, as a generalized category, is given a place in the world-picture, the grand map of everything. Living individuals give way to the future of the general human being. Instead, life no longer matters insofar as the

biological species of *homo sapiens* survives. Professor Brand's Plan B, as a product of certain calculation, pins down the "essence" of human civilization.[7] Therefore, people come to believe this distanced view of themselves to be objective. However, it neglects that such an outsider's point of view, or a "view from nowhere" in Thomas Nagel's term (56), is impossible in the first place. It is a blind premise imposed by a metaphysical way of thinking popularized in the modern age. Even scientists are part of the world they investigate. Objectivity is not derived from the external, but rather from transcendence within our immanence. Every perspective of a particular person (or other living organism) already entails objectivity. Hence, not only is *Interstellar*'s Plan B an unethical solution but so is Plan A. When professor Brand encourages Cooper to "get up there, and save" his children, he is not thinking about Murphy and Tom as individual beings who live in flesh and blood, but as mere numbers belonging to the population, as two specimens of the species *homo sapiens*. It is most disturbing to see that not only is Cooper convinced by such an encouragement but also that the film ends with a reconciliatory note without every confronting this issue.

But is that all? Must we conclude that *Interstellar* is simply an embodiment of the logic of the world-picture? Not exactly. The film says something more, perhaps even more than what the filmmakers intended. Together with *Gravity*, such Space exploration SF cinema can serve as an antidote, a reminder, and a suggestion for a way out of the logic of the world-picture. And yet, the alternative has to be sought not from without but from within.

Towards the end of his essay on the world-picture, Heidegger touches on the idea of the "gigantic," which slightly changes the tone of the essay and complicates the argument. "The gigantic," argues Heidegger, "is rather that through which the quantitative becomes a special quality and thus a remarkable kind of greatness" ("Age" 135). The gigantic becomes so

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[7] The sound design is also worth mentioning. Many spectators noticed when the film was released that all dialogues are almost inaudible, many of which are totally submerged in the constantly present non-diegetic music Hans Zimmer has composed for the film. Viewed against my argument here, it seems to have well demonstrated the point that real human individuals are not important, and they are no longer in control of the mood of the narrative progression. The grand universe and the enframing of the film take charge of sound and image. The narrative is taken by the sublimity of Space and propelled by the sense of awe. But most important of all, it reduces humans into an abstract whole that belongs to the abstract world-picture.

enormous that it is even made to disappear (135).

> [A]s soon as the gigantic in planning and calculating and adjusting and making secure shifts over out of the quantitative and becomes a special quality, then what is gigantic, and what can seemingly always be calculated completely, becomes, precisely through this, incalculable. (135)

The transformation of the gigantic into the incalculable leaves behind the "invisible shadow" that resists calculation. The incalculable and its shadow withdraw from the representation and remains something unique, something denied to be known (136).[8] To Heidegger, this is what is being revealed as a result of the happening of the gigantic. To us, this is where we will begin to seek an alternative to the world-picture.

Saving Home as an Alternative

As I have shown, quite a few Space exploration SF films derive their ideas from the logic of the world-picture. This begs the question whether this subgenre is doomed to follow such metaphysics. My answer is negative. The way-out of the world-picture is equally there *in* the films, but it requires us to return to world-experience, world-horizon, or what the later Husserl called the "earth-ground" (*Erdboden*).

In a research manuscript written during May 7 and 9, 1934, entitled "Foundational Investigations of the Phenomenological Origin of the Spatiality of Nature: The Originary Ark, the Earth, Does Not Move,"[9] Husserl addresses directly the issues of modern astrophysics and Space travel. This almost contemporaneous piece of writing points to the same problem

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[8] The concluding part of the essay and its related appendix are reminiscent of 谷崎 潤一郎(Tanizaki Jun'ichirō)'s 陰翳礼讃 (*In Praise of Shadows*), which is an essay on Japanese aesthetics published in 1933. In that essay, Tanizaki argues similarly in favor of shadows as opposed to light. Although it is mainly on aesthetics, the essay illustrates a long tradition of aesthetic preference in East Asia that is distinct from the logic of the world-picture which became popularized in the modern age.

[9] The manuscript is classified in Husserl's Archive (*Nachlass*) at Leuven as D-17 and transcribed by one of Husserl's assistants Ludwig Landgrebe. The original title goes like this: "*Umsturz der Kopernikalischen Lehre in der gewöhnlichen weltanschaulichen Interpretation. Die Ur-Arche Erde bewegt sich nicht. Grundlegende Untersuchungen zum phänomenologischen Ursprung der Körperlichkeit, der Räumlichkeit der Natur im ersten naturwissenschaftlichen Sinne, Alles notwendige Anfangsuntersuchungen.*" (The overthrowing of Copernican teachings in the ordinary interpretation of world-perception. The originary ark, earth, does not move. Foundational investigations of phenomenological origin of corporality, the spatiality of Nature in its first scientific sense. All necessary inquiries into the beginning. The translation is mine.)

identified in Heidegger's essay on the world-picture, but from a different perspective. Husserl notices that science treats the world as an "ideality of infinity" (118). It is a "ready made 'representation of the world,'" on which further representations are built (118). That is, the world-picture arises exactly from our world-experience, but the more "complete" and "objective" it becomes the farther it deviates from our original horizon. Gradually, one "takes for granted that [E]arth is a body [...] is only one of the accidental bodies of the world, one among others" (128). Therefore, abandoning a no longer inhabitable Earth and leaving for a new one becomes justifiable. However, "[E]arth is a spherical body, certainly not perceivable in its wholeness all at once and by one person; rather it is perceived in a primordial synthesis as a unity of mutually connected single experiences" (118). It is, essentially speaking, not at all an object for us, but a necessary horizon. The Copernican way of thinking, nonetheless, has made it into an object. What is "not experienced at first as body (*Körper*)" becomes just one among the innumerable celestial bodies. The logic of the world-picture "nullifies its primordial form of the ground" (118).

Husserl is not saying that Earth as a planet does not move; what he means is that the earth-ground neither moves nor rests. "Only in relation to it are movement and rest given as having their sense of movement and rest" (118). Modern astronomy and astrophysics take an external point of view that is itself posited as constantly still so that the movement of Earth can be determined. It is done through a sort of astronoetic activity, totally bereft of the role of our sensory body. The motion of the Earth planet is derived from the world-picture where the planet is given a specific place within the system. But as a matter of fact, the ground is neither moving nor at rest. "[M]otion is relative when experienced with respect to a 'ground-body,' which is itself experienced as at rest and in unity with my corporeal flesh" (121). What modern science has discovered therefore is not the world-horizon but the world-picture, while the world is always and already there, given together with our ordinary perception, as the horizontal background. The possibility of scientific induction is "determined through [horizontal] expectation and in the course of actual experience, my own and communicative experience, as a

consequence of actuality is shown to be confirmed or disconfirmed" (120).

It is important that the world-experience (or horizon) is originally a bodily experience. For Husserl, "[t]here is no pure point of view and there is no view from nowhere, there is only an embodied point of view" (Zahavi, *Phenomenology* 98). The body in any perceptual experience is regarded as the "zero point" and the "indexical 'here'", a "center around which and in relation to which (egocentric) space unfolds itself" (99). It is the body and our embodiment that render it possible for us to access worldly things. In addition to its status as a center of orientation, the body plays a crucial role in enacting the "kinaesthetic experience" which in turn enables our perception. On the one hand, the kinaesthetic experience grounds the unity of a perceptual experience and makes sure that the object intended remains one and the same. On the other hand, the very sense of spatiality is constituted as a background with the help of our kinaesthetic experience. The same goes for the world-horizon. To truly understand and feel the scientific world, the original embodied experience has to be activated. Otherwise, we take up the world-picture at the expense of the world-horizon.[10]

In this sense, "[m]y flesh is the center" (Husserl, "Foundational" 123). The world is first grasped as an intersubjective horizon that we share with others through our embodied experience. It is not an intellectual process, but rather a bodily one. Hence, Husserl speaks of birds and other animals as sharing with us the same world-horizon. But it does not mean that our world-experience will always remain the same. It never has. Everyone's horizon is constantly changing although it is always open to sharing. When Armstrong landed on the Moon, the shared world-horizon changed suddenly. However, such changes do not supplant the original world-experience we were born with, they *expand* it. Put otherwise, although we cannot but stick to the earthly horizon we were born with, it is always open to new possibilities and changes.

> The totality of the We, of human beings, of "animals," is in this sense earthly—and at
> first is not opposed to the nonearthly. This sense is rooted and has its orientation center in

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[10] In his famous research manuscript "Origin of Geometry," Husserl offers an insightful discussion on the loss of our link to the originary experience in modern science. He also identifies writing as a stand-in for the embodied experience of the original geometers. Similarly, Bernard Stiegler speaks of such a substitution of the embodied experience by representations as a "short-circuit" and a process of being "proletarianized" because the subjects are deprived of their *savoir-faire* (*Technics 3* 37; *Disbelief* 115, 142).

me and in a narrower We who live with one another. But it is also possible for the earth-ground to be extended, possibly such that I learn to understand that, within the space of my first earth-ground, there are *large aerial vessels* which travel in it for a long time: I am born on one of them and my family lives on one of them. It was my ontic ground until I learned that we were only sailors on the larger earth, etc. Thus a multiplicity of ground-lands, of homelands, is unified into one ground-land. (126; my emphasis)

Husserl envisages the possibility of a spaceship-born baby, to whom the spacecraft seems to serve as the original ground and hence different from his/her parents' earth-ground, but it is not exactly so. The "large aerial vessel" itself would be an extension of the earth-ground. Even for a Space baby, floating off structure in the vacuum is unthinkable. The baby is inevitably, although indirectly, linked to his/her parents' earth-ground.[11] The earth here functions as the "source-ground" (125). Moreover, if we think in a slightly different manner, the earth is just like a huge spacecraft travelling in the universe; it serves as the ground and at the same time also as the ark. In a word, the world-horizon will expand, but the accidental fact that we happen to be earthlings matters.

To return to *Gravity* and *Interstellar*, I find the two films particularly complex and rich in meaning among other contemporary SF films. In them, traces of our reflections above can be found, and they, whether intentionally or not, reveal that salvation is to be found here on earth instead of out there on some far away planets. By looking into both their formal aspects and thematic concerns, I will show how these two films manifest the significance of the earth-ground and how they point toward an alternative path to the world-picture.

With regards to the cinematic form, both *Gravity* and *Interstellar* take effort to make a world-representation (calculated) into a world-experience (actualized). As I have mentioned in Chapter two, *Gravity*'s extensive use of CGI aims to simulate and emulate the aesthetics of

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[11] Would future human descendants who migrate to another planet evolve to be otherwise than earth-bound? I have no answer to that. They might. Had situations allowed for it to happen in a distant future, our descendants, who might very well evolve new physiological features that we today cannot imagine to adapt to the new environment, could become almost disconnected from their ancestral planet—Earth and its earth-ground. It might be an entirely different matter to speak of Earth, e.g., the mythical homeland where the ancestors dwelled. However foggy and dim the primordial sense of being an earth-bound Being might become, the tradition—perhaps in a similar way we come to know about ancient (mostly legendary) myths—will still be there, retained as something unattainable yet significant in making what we will become in the future.

photographic moving images. For the look, Cuarón and his visual effects team from Framestone did a large amount of research on real documentary footage from previous astronautic activities. For camera movements, it is an entirely different thing. The team, working with the film's director of cinematography Emmanuel Lubezki, invented a novel domain for digital filmmaking: photographic footage incorporated into a digitally rendered photorealistic sequence with all the movements and lighting effects matched.

Some claim that such CGI effects create a different kind of realism, one that is "associated with nonhuman nature" (Jenner). Joseph Jenner contends that the computer-generated Earth "draws attention to the nonhuman nature of our planet," while live action footage foregrounds the "human experience" (Jenner). He draws a conclusion from it that the relation between human and nonhuman is fluid. However, doesn't such an argument presuppose the distinction between the human and the nonhuman in the first place? Moreover, he seems to have taken for granted that CGI must stand for the nonhuman, while photographic footage shows the human. To me, this does not seem so obvious. Isn't Bazin's understanding of photographic ontology essentially based on its automatic reproducibility? In this sense, photography seems much more nonhuman than the highly manipulable, human-made CGI. For many commentators, reflections on the technical choices stop at the term "CGI" without ever considering how it is carried out in a specific film. For the same reason, Ryan Pierson concludes that *Gravity* is a film without a world, and draws an analogy between it and Norman McLaren's abstract animation films. Here, I believe he pays too much attention to the technology instead of the finished images *per se*. It is absurd to say that *Gravity* is unworldly, for everyone who has watched the film knows it takes place mainly in the low Earth orbit.

In contrast to those scholars, I consider the film to be extremely earthbound despite its apparent uses of CGI for the majority of its images. It requires us to look at the (virtual) camera movements enacted by the software. Pierson argues against the use of the term "camera movement" when analyzing *Gravity* for the simple reason that the camera travels through the glass visor of Dr. Stone's helmet at one point of the film (7). But he does not recognize that this

shot, though seemingly against the law of physics, by no means rules out the *embodied experience* of the camera. Except for this particular moment, all other movements are strictly enacted according to physics and the view always conforms to the principle of perspective. Moreover, by "virtual camera," one does not simply mean a physical camera created within the digitally constructed 3D space, but, perhaps more specifically, a *point of view* that exists and takes place within a virtual space. It does not have to be physically "there" in the same sense as a character in the diegetic space. The "embodiment" of the virtual camera is thus to be understood as a point of view embedded within the storyworld, but not necessarily in the form of a material body.[12] Pierson's view is a little too materialist even when he is dealing with intangible, digitally created objects.

The (virtual) camera movements in *Gravity* enact in the spectators a series of potential kinaesthetic experiences through which they feel *as if* they were present in Space and cut loose from man-made structures. However, the feeling of dizziness evoked by such images inevitably presupposes the sense of stillness and balance on the earth-ground. It is the very horizon of the earth-ground the spectators have in the background that guarantees and anticipates the loss of balance and the sense of abnormality. Husserl has cogently argued that the horizon of the earth-ground is so essential that it can only be expanded but never relinquished. The fierce feeling of dizziness can only arise from the horizon of the earth-ground that is perceived as normative. It would be nonsensical to speak of dizziness without presupposing the state of not feeling dizzy. Nevertheless, as Husserl has added, it does not mean that the state of balance is necessarily the normative condition. For beings born and living in water or else, if possible, for future generations of humans who might be born in zero-G Space, it could well be the opposite. For them, the feeling of stillness on solid ground might be a state of abnormality. But since *Gravity* is intended for ground-dwelling human spectators, it is fine to speak of the kinaesthetic experience it creates as a departure from our normative and ordinary perceptual senses. To put it

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[12] Although the virtual camera is embedded in the storyworld, it is invisible to the characters (in most fiction films) and therefore does not *actually* belong to the storyworld. As I mentioned toward the end of Chapter two, the kinaesthetic experience spectators feel and the world-horizon that is conferred through such experiences take place in our horizons, a virtual realm that belongs neither to the storyworld nor to the real material world.

differently, in order for the effect to be successful, the film requires its spectators to be earthbound dwellers. Scott Richmond has recognized this implicated layer of senses, but does not go far enough to investigate the meaning of such proprioceptive experience. The kinaesthetic reaction *Gravity* provokes, I contend, not only offers an otherworldly experience but also points toward our own inescapable origin in the earth-ground.

The apparent tension between the story of the earthbound returning and the digital filmmaking techniques freed from earthly constraints is rendered less prominent through the use of the photorealistic aesthetics Cuarón has chosen. Dr. Stone displays a restored sense of security at the end of the film when she returns to Earth and struggles to be back on the ground. For the first time in the film, spectators regain the ground, both in the sense of narrative space and in the sense of kinaesthetic experience. What have been restored are not only earthbound camera movements and a state of balance, but also the meaning of being human, of having an earthbound existence.

The film's formal construction provides further support for the thematic ruminations about life. There are several moments where the rotating motion and disorientation are less noticeable. When Dr. Stone enters the International Space Station after losing Kowalski, she strips her spacesuit and helmet and starts to float gently in the airlock of the station. Against a circular door, Dr. Stone gradually holds her body into a fetal position. She is lit from behind by the sunlight coming through the window of the door. What we see is the image of an embryo. The door separates the threatening space outside and the protective space inside, turning the Space station into a mother, the airlock into a womb. The station functions as a (symbolic) mother who takes care of the baby—the astronauts—and the secured attachment to the station serves as the umbilical cord. The mothering role of the station discloses its nature as the extended earth-ground. The Space station, as well as spaceships, is an extension of the earth-ground where the earthlings feel safe and nurtured with necessities such as air, water, and food.

About half an hour later, we are in the Soyuz with Dr. Stone and she finds out that the main thruster is not working. She now tries to contact Houston for help, but what the radio captures

instead is someone who speaks a totally different language. A short film, directed by the screenwriter and son of Alfonso Cuarón, Jonás, was put online shortly before the film's release. It is entitled *Aningaaq*, about the character who is only heard through the radio inside the Soyuz spaceship. It takes place in an entirely different setting, perhaps in the frozen lands of North America. Aningaaq, an Inuit fisherman who is camping in a frozen fjord with his wife, his baby, and his dogs, manages to communicate with Dr. Stone via the two-way radio. Despite the fact that he only speaks his native tongue, of which Dr. Stone can understand nothing, the communication is somewhat successful. First, Aningaaq mistakes Dr. Stone's call for help "Mayday" to be her name, but Dr. Stone soon realizes this mistake and tries to correct him. Then, a dog's sound is heard. Aningaaq explains that she is an old sick dog and that he must kill her to end her suffering although he does not want to give her up. Dr. Stone also hears the dog, and mimics the woofs of dogs, which is then corrected by Aningaaq as inaccurate. During my first viewing of the film (and without knowing the existence of this short film), I conceived of this episode as a nonsensical yet meaningful self-reflection on the side of Dr. Stone. But after watching the short film, I learned something new about it. The communication that seems to be mutually incomprehensible is actually more successful than I had thought, not because of the establishment of some mutual understanding through language, but rather as a result of their belonging-togetherness to the world, to the earth-ground. If Earth is considered dispensable or at least replaceable by von Braun, Musk, and Nolan, perhaps it is because they do not see such a hidden aspect to life, that of living on earth *together with* other Earth dwellers (i.e., humans, animals, plants, etc.). The mutual nourishment and dependency this implies is part of what we are.[13]

This accidental encounter foreshadows Dr. Stone's self-reflection. In the hallucinatory sequence that follows, the imagined Kowalski says to her, "It's still a matter of what you do now. [...] You gotta plant both your feet on the ground and start living life." Kowalski is not there, so it is indeed Dr. Stone talking to herself. The series of encounters after the disaster reveals the

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[13] See also Haraway for a similar account. She proposes, "We need to make kin sym-chthonically, sym-poetically. Who and whatever we are, we need to make-with—become-with, compose-with—the earth-bound" (161).

meaning of life. She realizes that she has not been living her life since her daughter's death. She has disconnected herself from mother earth. When she wakes up from the hallucination, the first word coming out of her mouth is a whisper of "landing." To live, is to land on the ground, to reestablish the link (the umbilical cord) with mother earth.

The landing takes place minutes later, into the water. As many have noticed, the final sequence (besides its symbolic indication of Dr. Stone's rebirth) replays human evolution from aquatic animals to amphibians and reptiles, and finally to erect primate. A closer look unveils the meticulous and exquisite design of sound and image in this sequence. First, the regained sound (hence the air) intercut with a muffled sound underwater. As the lifeboat of Shenzhou is quickly submerged, Dr. Stone instinctively struggles for air instead of water. But she soon realized that even water is less dangerous than the vacuum of Space. Plunging into the water and freed from her spacesuit that drags her down to the bottom of the lake, she swims upward in similar fashion to the frogs seen in the foreground. The manmade protective shield (e.g., spacesuit) gives way to the natural skin, and life is restored in its original contact with the world. Once above the water, Dr. Stone's breathing is heard, and accompanying it (on the soundtrack) are the buzzing sounds of flying insects and chirps of birds, indicating that human life is never alone on earth. That life on earth is always a mesh of animals, plants, air, water, and even objects. Immediately after she touches the shore and grabs a handful of sand, Dr. Stone smiles and says "Thank you." To whom is she expressing her gratitude? I reckon it is to Kowalski, to her daughter, to herself, and also to the ground, the mothering earth. It is the earth-ground that gives her the sense of security, the power to live on, and the courage to finally face her daughter's death.

In comparison, it is more difficult to identify the message of the earth-ground in *Interstellar*, but the film also manages to express what it means to be an earthling through its filming process and messages hidden between the lines, images, and sounds. Examined merely on the level of the technological materiality, *Interstellar* seems poles apart from *Gravity*. The abandonment of the home planet in *Interstellar*'s storyworld is truncated by its predominant use of location shooting instead of the purely inventive digital generation. The preference for colonizing an alien planet

over saving mother earth is betrayed by the expressive devices and techniques Nolan is reputedly stubborn about—the insistence on using celluloid equipment rather than digital cameras and the obstinate uses of mock models in location shooting instead of green screens and computer-generated sets. In the bonus features accompanying the released BluRay disc, we learn that even the two lovable AIs are puppeteered by human actor Bill Irwin. The practice of embodied filming is somewhat revealing. Beneath the façade of an escapist story, there remains an untold aspect and Nolan's subconscious attachment to the earth-ground sometimes slip through his rigorously designed image-sound.

Whereas Cuarón's film is about the danger of Space, Nolan's envisions Space as a land of opportunity, a place of hope for the dying population on Earth. However, it does not have to be an either/or. So long as Space exploration remains connected to the earth-ground, we maintain both the meaning of being an earthling and the possibility of an open and constantly expanding horizon. The aesthetic form of the film is essentially earthbound.

First, the interplanetary mother ship Endurance is a spinning Space station, which follows the conception of von Braun and that of the Space Station 5 as well as Discovery. Different from the low Earth orbit in *Gravity* where micro-gravity dominates the scenes, *Interstellar* consists of episodes that are mainly earthbound. Besides a huge portion of the story taking place on Earth, most of the scenes about Space travel and alien planets are similarly portrayed as subject to gravitational pulls (in various degrees), not to mention the enormous Station Cooper which is made possible by harnessing gravitational laws. Whereas gravity is only restored at the end of *Gravity*, it is almost constantly present in *Interstellar*.

Second, the sandstorm interviews that start the film is actually footages quoted from Ken Burns' *The Dust Bowl* (2012) that recounts the experience of the Dust Bowl in the U.S. during the Great Depression. For Nolan, those survivors from the disastrous sandstorms might serve as evidence that catastrophes are nearer than we think, but for spectators of the film, they can be read in a very different way. If people of the 1930s have suffered through and survived such a hellish calamity, why couldn't we? The resilience of life seems to have been embodied in the

very slogan made popular in Britain during the Second World War: "Keep calm and carry on."

Third, another string that ties up the entire story is self-discovery. It all starts with Cooper's dismissal of the school teachers and his self-identification as an explorer. As I have discussed in the second section, his disrespect for the teachers, contempt for farming, and arrogance of his own ambition all boil down to his failed responsibility as a father. The journey to the alien galaxy is more of a journey into the bottom of his own heart. Without the separation and time dilation, Cooper could hardly understand his misstep, his choice of an empty world-picture over his own children. The self-discovery reveals his abandonment of home, and, despite the unsatisfying ending, urges a further move to self-salvation.

Lastly, Cooper's salvation does not really take place in Nolan's film as I have explained earlier, but it does not however rule out the possibility of finding hints and clues in the film that open up to an alternative. The film, in a similar way to *2001*, constantly delays the revelation of the alien's identity. These intelligent aliens are the ones who put a wormhole within humans' reach and help Cooper send back the quantum data collected in the black hole. These saviors are referred to as "they" throughout the film until Cooper concludes toward the end that "they" are actually "us" in the future. Similarly, the ghost in Murphy's bedroom has been Cooper all along. It is "they" who help us to understand ourselves, to learn that we should come back and save Earth. Instead of abandoning home, the earth-ground, the unbearable weight of love and family, it matters more to care and take care, to stay and cure. "They" are also those who contradict us, those who disagree with what we believe. "They" are the teachers, Cooper's son and father-in-law, and many people who think that it is a waste to spend money on Space programs. Explorers like Cooper can learn more if they reflect on their own arrogance and start listening to those whose opinions differ. One will be shocked if I quote what the female teacher says to Cooper, a line dismissed by Cooper and inundated by the main plot of the film: "If we don't want to repeat the excess and wastefulness of the twentieth century, then, we need to teach our kids about *this* planet, not tales of leaving it."

Interstellar, in a rather unexpected way, reveals a covert narrative that converges with

Gravity. The narrator of the NASA documentary *Hubble* notes, "It's said that in the process of going to the Moon, we discovered Earth;" in a similar way we can say that it is in the process of encountering the otherness of the nonearthly Space that we discover the earth-ground. The importance of nurturing, of taking care of our earth have become explicit only after human beings left the earth. Lazier has noticed that the concept of "environmental protection" or the German counterpart *Umweltschutz* was only coined shortly after the photograph of "Earthrise," and James Lovelock's Gaia hypothesis, despite its coinage in 1967, "flourished only in the late 1970s and 1980s (616-17). Hence, it is no coincidence that both *Gravity* and *Interstellar* concern themselves with ecological problems.

In reading between images and sounds, we have glimpsed into unexpected messages in Space exploration SF films. Despite their apparent focus on outward exploration, they always address implicitly the issues of the earthly ecology, or that of the Anthropocene. Many scholars have expressed the view that art can act as a power of salvation (see Morton); it can recompense where modern science is horribly lacking. The climate change, the constant extinction of species, and the potential threat of a visiting meteor, they are all common candidates for destroying humanity and the earth-ground. But fundamental to them all lies the logic of the world-picture Heidegger has exposed. The picture has led us astray, but it also discloses the invisible in the shadow, the meaning that cannot be represented but only understood through our intimate connection with the earth-ground. Science fiction films, especially those that focus on Space exploration can help us find the path alternative to the world-picture, exactly because they are themselves partly products of the very logic. The wisdom lying in the shadow awaits our discovery, and it will provide us with the Neganthropocenic power to redeem the Anthropocenic crime committed by the human (who followed the world-picture and a one-sided positivist science that lost sight of our own ground of meaning). What is the point of talking about living and surviving if the very ground of meaning has been lost? Distinctive as they are, *Gravity* and *Interstellar* manage to teach us this same lesson: instead of leaving and escaping, we might as well stay and save our mother earth and take care of the very ground of our being.

Conclusion

I have so far delved into the origin and history of the subgenre of Space exploration SF films, and investigated the interactions Space exploration SF has had with real scientific astronautics, revealing in the process how contemporary films belonging to this subgenre are largely indebted to the visual codes and syntagmas established by modern television live broadcasts of Space programs and astronautic activities. I also explored how contemporary films, such as *Gravity* and *Interstellar* push further the limits of the embodied tradition of world building by focusing on the creation of kinaesthetic immersion. Finally, I examined the logic of the world-picture inherent in this subgenre as well as its related danger, and, in order to counter it, sought an alternative way in the details of *Gravity* and *Interstellar* for reconnecting us with the earth-ground that provides the foundation for our world-horizon. The three chapters are intended 1) to offer an historical inquiry into the subgenre and how it interacts with real Space programs and astronautics, 2) to display the expansion and fusion of our horizon with regards to world and Space, and 3) to examine the interconnectedness of the affective-phenomenological aspect of world-experience (horizon) with the cognitive-thematic aspect of world-representation. In this final chapter, I wish to first address these three aspects against the larger background of film experience and world so as to show in what way they compensate Daniel Yacavone's study on film worlds. I will then conclude by exploring some potential issues my project might open up that await future study.

Experience, Horizon, and World

My thesis attempts to engage in a dialogue with Yacavone's volume on film worlds. In order to address the issue of "world" in film aesthetics, he has navigated vast areas of film theories, including semiotics, phenomenology, and hermeneutics. But it is somewhat surprising that he says very little about the notion of "horizon," except for a brief mention of Gadamer's idea of the "fusion of horizons" (237), where he focuses on the "transsubjective" nature of cinematic hermeneutics without really going into details on how it is to be carried through (240). In a word, he speaks of "world" merely as a vague encompassing label to bring everything under its

purview. But such a gesture fails to truly address the problem of world because of the lack of real theoretical attempts to do so; he fails to bridge the gap and reconcile the conflicts between these diverse theoretical positions referenced in the book. In short, Yacavone does not really provide a perspective or a method that can tie up all the threads he has introduced and synthesize the different topics that fall under the heading of "film worlds". The result is a list of approaches that can be used to engage film worlds, while each of them conflict with the others in fundamental ways. What is the point of talking about "film worlds" if anything can be included under this banner: from narrative storyworlds, to cognitive constructs, affective film experience, auteurs, all the way to interpretive and evaluative practices?

Instead of using the term "film world" in such a general and extremely broad sense, my thesis proposes a perspective of "world" *as horizon* inspired by the works of Husserl and Heidegger. It is not a step backward to draw on these "old" philosophical sources, but rather a necessary step forward. The fact is that all imaginary worlds (or other forms of world-representation) are founded by the fundamental world-horizon. World is not provided *solely by the film*, a conception Yacavone's study may have implicitly entailed since he says very little about the *perceptual world* of the audience; rather, world has always been there with the spectators. On the one hand, the world-horizon of our perception lends the foundation for film worlds. As I have argued in the Introduction, my horizontal consciousness determines what I see in cinematic images (and hear in cinematic sounds). If I take up the horizon of the material world, the images are mere light and shade. But if I take up the horizon for the film-object, I grasp directly the figures, the things, and the events taking place in a film. Such a cinematic horizon (based on our ordinary perceptual horizon) supplements what is not there in the material image, providing us with a world-horizon that surrounds the characters and the events depicted in film. On the other hand, the world-horizon in the film that is given simultaneously with the cinematic images helps the understanding of the film world as a representation. Only through our world-horizon can a storyworld or an imaginary world be grasped and then explicitly described. My proposal for a method and a perspective of "world-horizon" does not aim to achieve what

Yacavone intends in his grand book, but only to suggest a possible way of thinking that can help us better understand the film experience, and grasp that it is never an isolated experience but always and already part of the interplay of various extra-cinematic horizons: the imaginary, the perceptual, the scientific, etc. My study, therefore, is carried out by engaging three aspects of the issue of film worlds: the interplay between the cinematic and our ordinary perceptual horizons, the coincidence of Space exploration and cinema's exploratory nature, and the reconciliation of cognitive, affective, and interpretive approaches by introducing the extra-cinematic perspective of the world-horizon.

First, the history of the subgenre of Space exploration SF cinema, especially the embodied tradition, demonstrates well the interpenetration of horizons and the (photographically based) cinematic expansion of our perceptual world-horizon. As shown in the thesis, film worlds are not mere world-representations, i.e., storyworlds, or imaginary worlds shared by various narratives or cultural products; they are primarily world-experiences that have to be felt and sensed as horizons. In contrast to cinema (and photography), the horizons conferred by words (such as through novels) remain abstract and are by nature world-representations that share the features of the world-picture. Novelists such as H.G. Wells and Jules Verne indeed expanded our conceptual horizon (i.e., representations) about Space, technology, and society; their works and ideas helped the emergence of Space travel, of new means of transportation, and even of new forms of social organization. However, before their ideas were realized in various artefacts and worldly practices, such expansions of horizon remained at the conceptual level and were fundamentally different from the world-horizon achieved through sense perception. It was the inventions themselves that truly expanded our perceptual world, not the words that described them. Similarly, when von Braun tried to convince the general public as well as the government to sponsor the project of Space travel (to the Moon and Mars), the more effective elements were the illustrations by Chelsey Bonestell that accompanied his articles in *Collier's* magazine and the three-episode short films by Disney featuring von Braun and his models (of future Space stations and rockets). Both are illustrative of the old saying "Seeing is believing." Only an immersive experience of the

world-horizon can be incorporated into our perceptual horizon, and thus comes to be considered actual. This is also the reason why the embodied tradition is crucial in creating a world-experience for spectators. Through a perceptually based, as well as realistic and scientifically congruent cinematic horizon with regards to objects and events, the film world is rendered sensible and hence continuous with our ordinary perceptual world.

Nevertheless, as mentioned above, these world-horizons are not entirely the film(maker)s' products, they also require contributions from spectators. For instance, the developments of modern rocketry and Space programs were indebted to the early Space exploration SF films, especially *Frau im Mond*, not only because of the latter's creation of certain concepts about Space travel but also because they expanded our horizon by creating worlds that could be perceptually experienced as a continuation of our ordinary world. Later on, the immersive effects we experience when watching contemporary films such as *Gravity* and *Interstellar* are not merely the result of the films' affective power; they call for the spectators' own horizon of Space and Earth already conferred by the proliferated images from real scientific and documentary footage. In these films, the visual codes and syntagmas of Space travel with which viewers are familiar contribute substantially to the experience of immersion, alongside embodied experimental camera movements and sound designs. Such interactions between filmic horizon and perceptual horizon are what make these films excellent examples for exploring film worlds as horizon, as opposed to film worlds as representations.

Second, Space exploration is a particularly relevant area for the study of film worlds as horizon because it constantly involves the expansion of our perceptual horizon. If past frontiers were made of deadly deserts, insurmountable peaks, and seemingly borderless oceans, Space has become the contemporary world's new frontier. One of the reasons why the perceptual horizon, such as offered by ordinary perception or its mediation through film, is fundamental to our world-experience lies in the fact that, despite the conceptual horizons depicted for instance in creation myths, people's worlds are determined by what they are able to see and feel, such as the vanishing horizons of the land or the ocean. Globalization, modern transportation, and

intercommunication have gradually replaced the innumerable and variegated world-horizons of different cultures (and communities) with a merged horizon of our earth. The interconnected world-horizon has become the grand background for modern life and has been accepted as an essential ground for perception. For us today, the sky becomes the only dimension where the horizon remains indefinitely open and the only direction where the horizon can be continuously expanded.

Such a constantly expanding horizon concurs with cinema's exploratory nature. Interestingly, cinema is a medium that always aims to expand our horizon. As both Dudley Andrew and David Rodowick have argued, films, unlike many animations which rely on our imaginative power, are products of cooperation between the filmmaker and the world that is not entirely under control. The world has never failed to surprise us, shock us, and amaze us. To use Andrew's term, the very medium offers us a "cinema of discovery" (*What* 52), one that inherently intertwines with the expansion of horizon. We then have a fascinating situation where an exploratory medium meets one of the most important exploratory activities of the modern era. On the one hand, cinema takes us beyond the limits of our everyday world, opening us toward the unknown and the imaginary. With their ability to create *quasi-embodied horizons* and kinaesthetic senses, Space exploration SF films as well as live television broadcast intervene in the constitution of our world-horizon for Space, which pre-cinematic media are incapable of. On the other hand, the use of cinematic and video recorded sounds and images in Space programs and astronautic activities (both manned and unmanned) keeps increasing, to the point where it would seem impossible to think of the latter independently of the former. This relation between audiovisual footage and real Space activities renders possible a continuum between fictional astronautic events and real scientific practices. Also in this sense, cinema serves as a perfect medium to explore the issue of world, not only within film texts but also without, in relation to the extra-cinematic.

Third, the explorations set forth in this thesis also attempt to provide a possible resolution to an apparent inconsistency between the three aspects of film worlds offered, almost in parallel to

each other, in Yacavone's book: the cognitive-semiotic world, the affective-phenomenological world, and the interpretive-hermeneutic world. My analyses in the thesis demonstrate that the three worlds are actually interwoven and mutually interdependent. The thematic messages of both the logic of the world-picture and the alternative return to the earth-ground seen in *Gravity* and *Interstellar* are deeply entrenched in the films' formal constructions: the embodied method of world building, the conflicting horizons of different characters, and the inherent logic that is shared among modern Space programs. World-representation in film can only be arrived at through the spectators' world-experience of the film which is in turn founded on their horizon of the ordinary perceptual world.

In a sense, my addition of the world-horizon, as a fourth aspect of film world, cuts through the three aspects addressed by Yacavone's theory, and offers an extra-cinematic angle that can tie up the different phases of the cinematic experience. Because cinema is not something independent of our perceptual world or of other imaginary worlds, a proper engagement with the issue of film worlds requires us to treat film experience not as something *sui generis* but as the expansion and continuation of our ordinary perceptual world. The subgenre treated in this thesis takes advantage of such a continuation, interaction, and interpenetration.

The Opening ... at the End

More questions remain to be answered, however. Although I have argued why cinema is regarded as a medium that works much better than other pre-cinematic media to achieve the goal of expanding our perceptual world-horizon, it is nonetheless true that literature and other forms of art have been doing this long before the creation of cinema. This can be traced back to the time of writing (poems and novels), or perhaps even earlier, when our ancestors started to pass on words about what had been experienced only by a select few individuals. Definitely, this may pose challenges I cannot respond to at the moment. Understood that my horizon does not only belong to me but is also shared among others, it must have undergone similar processes of expansion and fusion. Being taught at school to add and subtract, to speak, to write, and to understand words written centuries ago by someone we are not able to meet in person, we exist

in a state of constant becoming that incorporates different horizons about different things into our own. This is exactly what we mean by "education."

In the process of being educated, our world-horizon also changes and expands, although in a different way than the expansion of horizon that takes place when watching a film. Somehow, these imaginary or conceptual influences exert similar effects on our perception of the world. Our perceptual horizon is called for and it plays an essential role in our efforts to understand and comprehend things that have been taught. Bernard Stiegler poignantly points out that this very process takes place in our inner time-consciousness. He contends that newly learned ideas and concepts are enacted in the form of experience and are incorporated into the *retentive* structure where these experientially enacted ideas will later become our memory (*Technics 3*). Similarly, when we start to learn something new, these ideas and concepts are anticipated by a *protentive* horizon, one that helps us contextualize and situate the new knowledge. Many other things happen in the process. It may also involve imaginative participation from time to time in that my memory (or retentive content) can be reactivated as a horizon that opens up toward the prospective knowledge. My ability to anticipate—and equally to be shocked by—new knowledge reveals the working of my horizon.

But, how are these processes different from the cinematic horizon? Is the perceptual horizon only evoked by physical images (but not by some of the more abstract forms of imagery found in written words)? What about the participation of imagination in watching films? These are important questions, to which, however, I do not yet have answers. They will point us to an old yet still unsolved puzzle about our faith in photography. In the digital age, such faith has been marred by the manipulating power of the new technology, but it nevertheless remains. What people tend to trust less is not the photographic image but the process of making it. Whether it is produced purely by the automatic photographic mechanism (be it in the form of celluloid or digital data) is no longer obvious. However, our faith in photography (i.e., in its very ability to seize or capture the world as it is) still plays an important role. As long as photography's function as souvenir (e.g., selfies, family photo albums, and tourist photographs) and our

stubbornness in using it remain an essential part of our life, this faith will persist. These questions have to be left out for now, but hopefully they will find their ways into my future projects.

Works Cited

Altman, Rick. "A Semantic/Syntactic Approach to Film Genre." *Cinema Journal* 23.3 (1984): 6-18.

Andrew, Dudley. *Concepts in Film Theory*. Oxford: Oxford UP, 1984.

---. *What Cinema Is! Bazin's Quest and Its Charge*. Chichester: Wiley-Blackwell, 2010.

B, Benjamin. "Facing the Void." *American Cinematographer* 94.11 (2013): 36-49.

Barker, Jennifer M. *The Tactile Eye*. Berkeley: University of California Press, 2009.

Bender, Stuart. "There is Nothing to Carry Sound: Defamiliarization and Reported Realism in *Gravity*." *Sense of Cinema* 71 (2014).

Biddle, Wayne. *Dark Side of the Moon: Wernher von Braun, the Third Reich, and the Space Race*. EPUB ed., New York: W.W. Norton, 2009.

Blumenberg, Hans. *Die Vollzähligkeit der Sterne*. Frankfurt: Suhrkamp, 1997.

Bordwell, David. *The Way Hollywood Tells It: Story and Style in Modern Movies*. Berkeley, University of California Press, 2006.

Bould, Mark. *Science Fiction*. London: Routledge, 2012.

Bowler, Jacinta. "A Cosmology Professor Accidentally Announces The Re-Discovery of Mars." *Science Alert*. 22 Mar. 2018. https://www.sciencealert.com/a-cosmology-professor-peter-dunsby-accidentally-announces-the-re-discovery-of-mars-astronomers-telegram. Accessed 10 May 2018.

Carruthers, Lee. *Doing Time: Temporality, Hermeneutics, and Contemporary Cinema*. Albany, NY: SUNY Press, 2016.

Casebier, Allen. *Film and Phenomenology: Toward A Realist Theory of Cinematic Representation*. Cambridge, UK: Cambridge University Press, 1991.

Chamarette, Jennifer. *Phenomenology and the Future of Film*. Basingstoke, UK: Palgrave, 2012.

Chang, Kenneth. "Elon Musk's Plan: Get Humans to Mars, and Beyond." *New York Times*. 27 Sept. 2016. https://www.nytimes.com/2016/09/28/science/elon-musk-spacex-mars-exploration.html. Accessed 12 Feb. 2018.

China Central Television (CCTV). *CNTV News*. 2010, http://news.cntv.cn/special/tiangong/shenzhouhuimou/01/index.shtml. Accessed 11 Oct. 2017.

Christensen, Peter G. "Women as Princesses or Comrades: Ambivalences in Yakov Protazanov's 'Aelita' (1924)." *New Zealand Slavonic Journal* (2000): 107-22.

Ciccorico, David. *Refiguring Minds in Narrative Media*. Lincoln, NB: University of Nebraska Press, 2015.

Daley, Jason. "American Scientists Took the First Photo of Earth From Space using Nazi Rockets." 24 Oct. 2016. https://www.smithsonianmag.com/smart-news/70-years-ago-today-nazi-rockets-and-american-scientists-took-first-photo-earth-space-180960890. Accessed 11 July 2017.

D'Aloia, Adriano. "The Character's Body and the Viewer: Cinematic Empathy and Embodied Simulation in the Film Experience." *Embodied Cognition and Cinema*. Eds. Maarten Coëgnarts and Peter Kravanja. Leuven: Leuven University Press, 2015. 187-99.

---. "Cinematic Empathy: Spectator Involvement in the Film Experience." *Kinesthetic Empathy in Creative and Cultural Practices*. Eds. Dee Reynolds and Matthew Reason. Bristol: Intellect, 2012. 91-108.

Davis, Susan G. Review of *Media Events: The Live Broadcasting of History*, by Daniel Dayan and Elihu Katz. *Critical Inquiry* 63.1 (1993): 129-31.

Dennett, Daniel. *Consciousness Explained*. London: Penguin, 1991.

Drummond, John J. "On Seeing a Material Thing in Space: The Role of Kinaesthesis in Visual Perception." *Philosophy and Phenomenological Research* 40.1 (1979): 19-32.

Dufrenne, Mikel. *The Phenomenology of Aesthetic Experience*. Translated by Edward S. Casey, Albert A. Anderson, Willis Domingo, and Leon Jacobson. Evanston: Northwestern University Press, 1973.

Ferencz-Flatz, Christian, and Julian Hanich, eds. *Film Phenomnology*. Spec. Issue of *Studia Phænomenologica* 16 (2016).

Giardina, Carolyn. "5 Ways They Sent Sandra Bullock Into Outer Space." *Hollywood Reporter* 36 (2013): 30.

Giardina, Carolyn, and Borys Kit. "Making of *Gravity*." *Hollywood Reporter* 420.2 (2014): 84-87.

Goldman, Michael. "*Dunkirk* Post: Wrangling Two Large Formats." *American Cinematographer*. https://ascmag.com/articles/dunkirk-wrangling-two-large-formats. Accessed 28 July 2017.

Gunning, Tom. "The Cinema of Attraction: Early Film, Its Spectator, and the Avant-Garde." *Wide Angle* 8.3-4 (1986): 63-70.

Gunning, Tom, and Katharina Loew. "Lunar Longings and Rocket Fever: Rediscovering *Woman*

in the Moon." *A Companion to Fritz Lang*. Chichester, UK: Wiley Blackwell, 2015. 554-86.

Hanich, Julian. *The Audience Effect: On the Collective Cinema Experience*. Edinburgh: Edinburgh University Press, 2018.

---. *Cinematic Emotion in Horror Films and Thrillers*. London: Routledge, 2010.

Haraway, Donna. "Anthropocen, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6 (2015): 159-65.

Hardesty, Von and Gene Eisman. *Epic Rivalry: The Inside Story of the Soviet and American Space Race.* Washington, D.C.: National Geographic, 2007.

Heidegger, Martin. "The Origin of the Work of Art." *Poetry, Language, Thought*, translated by Albert Hofstadter. New York: Harper, 1975.

---. *Pathmark*. Translated by Thomas Sheehan, edited by William McNeill. Cambridge: Cambridge University Press, 1998.

---. *The Question Concerning Technology and Other Essays*, translated by William Lovitt. New York: Harper and Row, 1977.

Herdman, H.F.P. "Early Discoverers XII: Some Notes on Sea Ice Observed By Captain James Cook, R.N., During his Circumnavigation of Antarctica, 1772–75." *Journal of Glaciology* 3.26 (1959): 534-41.

Herman, David. *Basic Elements of Narrative*. Chichester: Wiley-Blackwell, 2009.

Hjelmslev, Louis, *Prolegomena to a Theory of Language*. Translated by Francis J. Whitfield. Madison: University of Wisconsin Press, 1969.

Howell, Elizabeth. "Columbia Disaster: What Happened, What NASA Learned." 14 Nov. 2017, https://www.space.com/19436-columbia-disaster.html. Accessed 12 Jan. 2018.

Husserl, Edmund. *Analyses Concerning Passive and Active Synthesis*. Translated by Anthony J. Steinbock. Dordrecht: Kluwer, 1966.

---. *Cartesian Meditations*. Translated by Dorion Cairns. Dordrecht: Springer, 1960.

---. *Crisis of European Sciences and Transcendental Phenomenology*. Translated by David Carr. Evanston: Northwestern UP, 1970.

---. *Erste Philosophie (1923/24): Zweiter Teil (Husserliana VIII)*. Edited by Rudolf Boehm. Dordrecht: Kluwer, 1996.

---. *Experience and Judgment*. Edited by Ludwig Landgrebe, translated by James Churchill and Karl Ameriks. London: Routledge, 1939.

---. *Formal and Transcendental Logic*. Translated by Dorion Cairns. The Hague: Martinus Nijhoff, 1974.

---. "Foundational Investigations of the Phenomenological Origin of the Spatiality of Nature: The Originary Ark, the Earth, Does Not Move." *Husserl at the Limits of Phenomenology*. Edited by Leonard Lawlor and Bettina Bergo, translated by Fred Kersten and revised by Leonard Lawlor. Evanston: Northwestern University Press, 2002. 117-32.

---. *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy Second Book: Studies in the Phenomenology of Constitution*. Translated by Richard Rojcewicz and André Schuwer. Dordrecht: Kluwer, 1952.

---. *Die Lebenswelt: Auslegungen der vorgegebenen Welt und ihrer Konstitution. Texte aus dem Nachlass (1916-1937) (Husserliana XXXIX)*. Edited by Rochus Sowa. Dordrecht: Springer, 2008.

---. *Logical Investigations Volume II*. Edited by Dermot Moran, translated by J.N. Findlay. London: Routledge, 2001.

---. "Origin of Geometry." *The Crisis of European Sciences and Transcendental Phenomenology*. Translated by David Carr. Evanston: Northwestern University Press, 1970.

---. *Phantasy, Image-Consciousness and Memory (1898-1925)*. Translated by John Brough. Dordrecht: Springer, 2005.

---. *Thing and Space: Lectures of 1907*. Translated by Richard Rojcewicz. Dordrecht: Springer, 1973.

Huzel, Dieter. *From Peenemünde to Canaveral*. Engelswood Cliffs, NJ: Prentice-Hall, 1962.

Jakobson, Roman. "Typological Studies and Their Contribution to Historical Comparative Linguistics." *Selected Writings I: Phonological Studies*. The Hague: Mouton, 1962.

James, Oliver, Eugénie von Tunzelmann, Paul Franklin, Kip S. Thorne. "Gravitational Lensing by Spinning Black Holes in Astrophysics, and in the Movie *Interstellar*." *Classical and Quantum Gravity* 32 (2015).

---. "Visualizing *Interstellar*'s Wormhole." *American Journal of Physics* 83.6 (2015): 486-99.

Jameson, Fredric. *Archaeologies of the Future*. London: Verso, 2005.

Jenkins, Henry. *Convergence Culture: Where Old and New Media Collide*. NY: NYU Press, 2006.

Jenner, Joseph. "Posthuman Encounters: Experiencing the Anthropocene in Alfonso Cuarón's *Gravity*." *Film-Philosophy* Conference, 5 July 2017, Lancaster University, Lancaster, UK. Conference Presentation.

Kant, Immanuel. *Critique of Pure Reason*. Translated by J.M.D. Meiklejohn. London: Henry G. Bohn, 1855.

Katz, Elihu, and Daniel Dayan. "Media Events: On the Experience of Not Being There."

Religion 15.3 (1985): 305-14.

Klastrup, Lisbeth, and Susana Tosca. "Transmedial Worlds—Rethinking Cyberworld Design." *Proceedings of the 2004 International Conference on Cyberworlds*. Los Alamitos CA: IEEEE Computer Society, 2004. N. pag. PDF file. June 1, 2012.

Kuhn, Annette, ed. *Alien Zone II: The Spaces of Science Fiction Cinema*. London: Verso, 1999.

Lain, Tarja and Wanda Strauven, eds. *The Synaesthetic Turn.* Spec. issue of *New Review of Film and Television Studies* 7.3 (2009).

Lawlor, Leonard. "Essence and Language: The Rupture in Merleau-Ponty's Philosophy." *Studia Phænomenologica* 3-4 (2003): 155-62.

Lazier, Benjamin. "Earthrise; or, The Globalization of the World Picture." *American Historical Review* 116.3 (2011): 602-30.

Marks, Laura U. *Enfoldment and Infinity*. Cambridge, MA: MIT Press, 2010.

---. *The Skin of the Film*. Durham, NC: Duke University Press, 2000.

---. *Touch: Sensuous Theory and Multisensory Media*. Minneapolis: U of Minnesota P, 2002.

Méliès, Georges. "Importance du scénario." *Georges Méliès*, written by Georges Sadoul. Paris: Seghers, 1961.

Merleau-Ponty, Maurice. "The Film and the New Psychology." (1945) *Sense and Nonsense*. Translated and Edited by Hubert Dreyfus and Patricia Allen Dreyfus. Evanston, IL: Northwestern University Press, 1964. 48-62.

---. *Husserl at the Limits of Phenomenology*. Translated and edited by Leonard Lawlor and Bettina Bergo. Evanston, IL: Northwestern University Press, 2002.

---. *Phenomenology of Perception*. Translated by Donald Landes. London and NY: Routledge, 2012.

Metz, Christian. *Film Language: A Semiotics of the Cinema*. Translated by Michael Taylor. Chicago: University of Chicago Press, 1974.

---. "'Trucage' and the Film." Translated by Françoise Meltzer. *Critical Inquiry* 3.4 (1977): 657-75.

Michelson, Annette. "Bodies in Space." *Artforum* 7.6 (1969): 59-68.

Morton, Timothy. *Dark Ecology: For A Logic of Future Coexistence*. New York: Columbia University Press, 2016.

Nagel, Thomas. *The View from Nowhere*. Oxford: Oxford University Press, 1986.

NASA. "On-Orbit Elements." Archived from the original page on 29 Oct. 2009.

https://web.archive.org/web/20091029013438/http://www.nasa.gov/externalflash/ISSRG/pdfs/on_orbit.pdf. Accessed 19. Jun. 2010.

Neufeld, Michael, J. *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile Era*. EPUB ed., Washington, DC: Smithsonian, 1995.

---. *Von Braun: Dreamer of Space, Engineer of War*. EPUB ed., New York: Vintage, 2008.

Noë, Alva. *Action in Perception*. Cambridge: MIT Press, 2004.

Oberth, Hermann. *Ways to Spaceflight*. NASA, 1970.

People's Daily. "President Hu Hails Successful Launch of Shenzhou V." 15 Oct. 2003, http://en.people.cn/200310/15/eng20031015_126054.shtml. Accessed 18 Apr. 2018.

Pierson, Ryan. "Whole-Screen Metamorphosis and the Imagined Camera (Notes on Perspectival Movement in Animation)." *Animation* 10.1 (2015): 6-21.

Reinhardt, Tony. "First Photo from Space." *Air & Space Magazine*. 24 Oct. 2006. https://www.airspacemag.com/space/the-first-photo-from-space-13721411. Accessed 15 Dec. 2017.

Reis, Michael. "Tiangong-2: China's Space Lab for Long Missions." 3 Nov. 2016, https://www.space.com/34614-tiangong-2-china-space-lab-explained-infographic.html. Accessed 10 Jan. 2018.

Richmond, Scott C. *Cinema's Bodily Illusions: Flying, Floating, and Hallucinatng*. Minneapolis, MN: University of Minnesota Press, 2016.

Ricœuer, Paul. "The Function of Fiction in Shaping Reality." *Man and World* 12.2 (1979): 123-41.

Roop, Lee. "Aide says von Braun wasn't able to stop slave horrors." *The Huntsville Times*. 4 Oct. 2002. Archived on Archieve.org https://web.archive.org/web/20021026180521/http://www.al.com/news/huntsvilletimes/index.ssf?%2Fxml%2Fstory.ssf%2Fhtml_standard.xsl%3F%2Fbase%2Fnews%2F1033754724262943.xml. Accessed 11 Jan. 2018.

Ryan, Marie-Laure. *Avatars of Story*. Minneapolis, MN: University of Minnesota Press, 2006.

Ryan, Marie-Laure, and Jan-Noël Thon, eds. *Storyworlds across Media*. Lincoln: University of Nebraska Press, 2014.

Sartre, Jean-Paul. *The Imaginary*. Translated by Jonathan Webber. London: Routledge, 2004.

Shoot Online. "VFX Supervisor Webber Shares The Creative Pull of *Gravity*." *SHOOT* 54.10 (2013): 18-28.

Sobchack, Vivian. *Address of the Eye*. Princeton: Princeton University Press, 1992.

---. *Carnal Thought.* Berkeley: University of California Press, 2004.

---. *Screening Space: The American Science Fiction Film*. 1980. NY: Ungar, 1988.

Solomon, Matthew. Introduction. *Fantastic Voyages of the Cinematic Imagination: Georges Méliès's Trip to the Moon*. Ed. Matthew Solomon. NY: SUNY Press, 2011. 1-24.

Sontag, Susan. "The Imagination of Disaster." *Commentary* 40.4 (1965): 42-48.

Stiegler, Bernard. *Disbelief and Discredit vol. 1: The Decadence of Industrial Democracies*. Translated by Daniel Ross and Suzanne Arnold. Cambridge: Polity, 2011.

---. *Technics and Time vol.3: Cinematic Time and the Question of Malaise.* Translated by Stephen Barker. Stanford: Stanford University Press, 2011.

Suvin, Darko. *Metamorphoses of Science Fiction*. New Haven, CT: Yale University Press, 1979.

---. "On the Poetics of the Science Fiction Genre." *College English* 34.3 (1972): 372-82.

Tanizaki, Jun'ichirō. *In'ei Raisan* (*In Praise of Shadows*). 1933. Tokyo: Kadokawa, 2014.

Thompson, Kristin. "Government Policies and Practical Necessities in the Soviet Cinema of the 1920s." *The Red Screen: Politics, Society and Art in Soviet Cinema*. Ed. Anna Lawton. New York: Routledge, 1992. 19-41.

Thon, Jan-Noël. *Transmedial Narratology and Contemporary Media Culture*. Lincoln: University of Nebraska Press, 2016.

---, ed. Spec. issue of *Storyworlds* 7.2 (2015).

Thoss, Jeff. *When Storyworlds Collide: Metalepsis in Popular Fiction, Film and Comics*. Leiden: Brill, 2015.

Tuan, Yi-Fu. *Space and Place: The Perspective of Experience*. 1977. Minneapolis: University of Minnesota Press, 2001.

"USNO NAVSTART Global Positioning System." *The United States Naval Observatory*. n.d. http://tycho.usno.navy.mil/gpsinfo.html. Accessed 7 Jan. 2017.

Varela, Francisco J., Evan Thompson, and Eleanor Rosch. *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge: MIT Press, 1991.

Village Voice. "100 Best Films of the 20th Century by the Village Voice Critics' Poll." 2001. http://www.filmsite.org/villvoice.html. Accessed 30 Jan. 2018.

von Braun, Wernher. "Crossing the Last Frontier." *Collier's* (March 22, 1952): 24-29.

---. *The Mars Project*. 1952. Urbana and Chicago, University of Illinois Press, 1991.

von Braun, Wernher, and Frederick Ordway. *History of Rocketry and Space Travel*. New York: Thomas Y. Crowell, 1966.

von Braun, Wernher, and Cornelius Ryan. "Baby Space Station." *Collier's* (June 27, 1953): 33-41.

Wahlberg, Malin. *Documentary Time*. Minneapolis, MN: University of Minnesota Press, 2008.

Walton, Roberto J. Review of *Die Lebenswelt. Auslegungen der vorgegebenen Welt und ihrer Konstitution. Texte aus dem Nachlass (1916-1937)*, by Edmund Husserl, edited by Rochus Sowa. *Husserl Studies* 26 (2010): 205-24.

---. "World-Experience, World-Representation, and the World as an Idea." *Husserl Studies* 14 (1997): 1-20.

Walton, Saige. *Cinema's Baroque Flesh*. Amsterdam: Amsterdam University Press, 2016.

Winter, Jessica. "Space Race." *Time* 182.16 (2013): 50-52.

Wolf, Mark J.P. *Building Imaginary Worlds: The Theory and History of Subcreation*. NY: Routledge, 2012.

---. "World Design." *The Routledge Companion to Imaginary Worlds*, edited by Mark J.P. Wolf. London and New York: Routledge, 2017. 67-73.

Wollheim, Richard. "Seeing-as, Seeing-in, and Pictorial Representation." *Art and Its Objects*. 2nd edition. Cambridge: Cambridge University Press, 1980.

Yacavone, Daniel. *Film Worlds: A Philosophical Aesthetics of Cinema*. NY: Columbia UP, 2015.

Zahavi, Dan. *Husserl's Legacy: Phenomenology, Metaphysics, & Transcendental Philosophy*. Oxford: Oxford University Press, 2018.

---. *Husserl's Phenomenology*. Stanford: Stanford University Press, 2013.

---. "Phenomenology and the Project of Naturalization." *Phenomenology and Cognitive Sciences* 3 (2004): 331-47.

Filmography

Alien. Directed by Ridley Scott, performances by Tom Skerritt, Sigourney Weaver, Veronica Cartwright, Harry Dean Stanton, and John Hurt, 20th Century Fox, 1979.

Aningaaq. Directed by Jonás Cuarón, performances by Orto Ignatiussen and Lajla Lange, Warner Bros., 2013.

Apollo 13. Directed by Ron Howard, performances by Tom Hanks, Kevin Bacon, Bill Paxton, Gray Sinise, Ed Harris, and Kathleen Horner, Universal, 1995.

Blinkity Blank. Directed by Norman McLaren, NFB, 1995.

The Congress. Directed by Ari Folman, performances by Robin Wright, ARP Sélection and Drafthouse Films, 2013.

Contact. Directed by Robert Zemeckis, performances by Jodie Foster, Matthew McConaughey, James Woods, and John Hurt, Warner Bros., 1997.

Deep Impact. Directed by Mimi Leder, perfomances by Robert Duvall, Téa Leoni, Elijah Wood, and Vanessa Redgrave, Paramount and DreamWorks, 1998.

Destination Moon. Directed by Irving Pichel, produced by George Pal, performances by John Archer, Warner Anderson, Tom Powers, and Dick Wesson, Eagle-Lion Classics, 1950.

The Dust Bowl. Directed by Ken Burns, written by Dayton Duncan, PBS, 2012.

First Men. Directed by Damien Chazelle, perfomances by Ryan Gosling, Claire Foy, Corey Stoll, and Kyle Chandler, DreamWorks, Temple Hill, Universal, 2018.

Frau im Mond (*Women in the Moon*). Directed by Fritz Lang, performances by Willy Fritsch, Gerda Maurus, Klaus Pohl, Fritz Rasp, Gustl Gstettenbaur, and Gustav von Wangenheim, UFA, 1929.

Гагарин. Первый в космосе (*Gagarin: First in Space*). Directed by Pavel Parkhomenko, performances by Yaroslav Zhalnin, Mihjail Filippov, Olga Ivanova, and Vadim Michman, Kremlin Films, 2013.

Gravity. Directed by Alfonso Cuarón, performances by Sandra Bullock and George Clooney, Warner Bros., 2013.

Himmelskibet (*A Trip to Mars*). Directed by Holger-Madsen, performances by Gunnar Tolnæs, Zanny Petersen, Nicolai Neiiendam, and Alf Blütecher, Nordisk Films Kompagni, 1918.

Hubble. Directed by Toni Myers, IMAX and Warner Bros., 2010.

Interstellar. Directed by Christopher Nolan, performances by Matthew McConaughey, Anne

Hathaway, Jessica Chastain, Bill Irwin, Ellen Burstyn, and Michael Caine, Paramount and Warner Bros., 2014.

"The Journeys of Apollo." *YouTube*, uploaded by NASA, 16 Jul. 2014, www.youtube.com/watch?v=GNJpoP642wc.

Marooned. Directed by John Sturgess, performances by Gregory Peck, Richard Crenna, David Janssen, and James Franciscus, Columbia Pictures, 1969.

The Martian. Directed by Ridley Scott, performances by Matt Damon, Jessica Chastain, Kristen Wiig, and Jeff Daniels, 20th Century Fox, 2015.

The Metamorphosis of Mr. Samsa. Directed by Caroline Leaf, NFB, 2006.

Mission to Mars. Directed by Brian De Palma, performances by Gary Sinise, Don Cheadie, Connie Nielsen, and Jerry O'Connell, Touchstone, Spyglass, 2000.

Passengers. Directed by Morten Tyldum, perfomances by Jennifer Lawrence, Chris Pratt, Michael Sheen, and Laurence Fishburne, Columbia Picture, 2016.

"Race for Satellites." Space Race, directed by Christopher Spencer and Mark Everest, performances by Richard Dillane, John Warnaby, and Ravil Isyanov, BBC, 2005.

Салют 7 (*Salyut 7*). Directed by Klim Shipenko, performances by Vladimir Vdovichenkov, Pavel Derevyanko, Igor Ugolnikov, and Lyubov Aksyonova, CTB and Globus-film, 2017.

Space Station 3D. Directed by Toni Myers, IMAX, 2002.

Tomorrow Land. Directed by Ward Kimball, performances by Wernher von Braun, Disney, [1955-57] 2004.

Tron. Directed by Stephen Liesberger, performances by Jeff Bridges, Bruce Boxleitner, David Warner, and Cindy Morgan, Disney, 1982.

Le Voyage dans la lune (*A Trip to the Moon*). Directed by Georges Méliès, performances by Georges Méliès, Bleuette Bernon, François Lallement, and Henri Delannoy, Star Film, 1902.

Valerian and the City of a Thousand Planets. Directed by Luc Besson, performances by Dane DeHaan, Cara Delevingne, Clive Owen, Rihana, and Ethan Hawke, EuropaCorp, 2017.

Время первых (*The Age of Pioneers*). Directed by Dmitriy Kiselev, performances by Yevgeny Mironov, Konstantin Khabensky, and Vladimir Ilyin, Bazelevs, 2017.