Dear Miss Engl,

For quite some time we have been watching your artistic work on earth. Your critical approach towards public space is a main topic of your artistic research. For some time you have been interested in the possibility of placing art in outer space.

Our foundation has decided to support you and your projects, and to give you the possibility to develop an artistic concept for outer space. We believe, that art has to play a more important role in the technical domain of astronautics. Besides, we want to support a critical arts practice in outer space.

Outer space is, one could say, the most public of all spaces. It offers you the possibility to communicate your ideas in a broader way to a bigger audience. The potential spectators are the whole worlds population.

We are sure that you will take advantage of this challenge. We consciously ask you, as a young female artist, because from our point of view outer space should be an experimental space for new artistic strategies.

Your artistic freedom is unlimited. You can decide if you want to develop a sculptural work or a participatory project.

We would like you to communicate your project ideas as soon as possible, so we can prepare technically for the realisation of the project in an appropriate way.

We are looking forward to working together with you

Best regards
The anonymous commissioner

Dear Ladies and Gentlemen,

I want to thank you for the invitation to develop an art project for outer space. I am very pleased that you have chosen me. I will be happy to accept the challenge and develop a concept that continues my research into critical arts practice for public spaces in outer space.

As I am stepping, so to say, on "new ground" with this commission, I suggest, that I will first analyse the conditions for an art practice in outer space. I am sorry to delay the realisation of the project a little, but I am sure you will agree, that a detailed site analysis is essential for further investigation in critical arts practice in space.
I will put together a short summary that can function as a basis for future research for artists. First, I will briefly review arts practice in public spaces on earth, and compare them to the possibilities in outer space. Next, I will analyse the political and commercial interests in outer space. I can imagine, that they are similar to the situation on earth and thus I will try to develop a critical artistic strategy for outer space by following along the lines of the critical approach on earth. If you want to, I could also add a short review of art projects that are already planned for outer space.

Thus a kind of practical handbook for critical arts practice in the public outer space will be created. I am sure that this is also in your interest, as you can give this outline as reference material to other artists, you support.

The artistic concept will be developed directly after the site research. I hope, that you agree to this short but unavoidable detour. Please let me know your opinion in this regard. You can call me any time.

Best wishes
Beate Engl

Space is a place

Outer space as a possible new site
for art in public space
in the age of its commercialisation

Compiled and expanded by
Beate Engl

Masters thesis
MFA
"Public art and new artistic strategies"
Bauhaus University Weimar
Advisor: Ralf Homann
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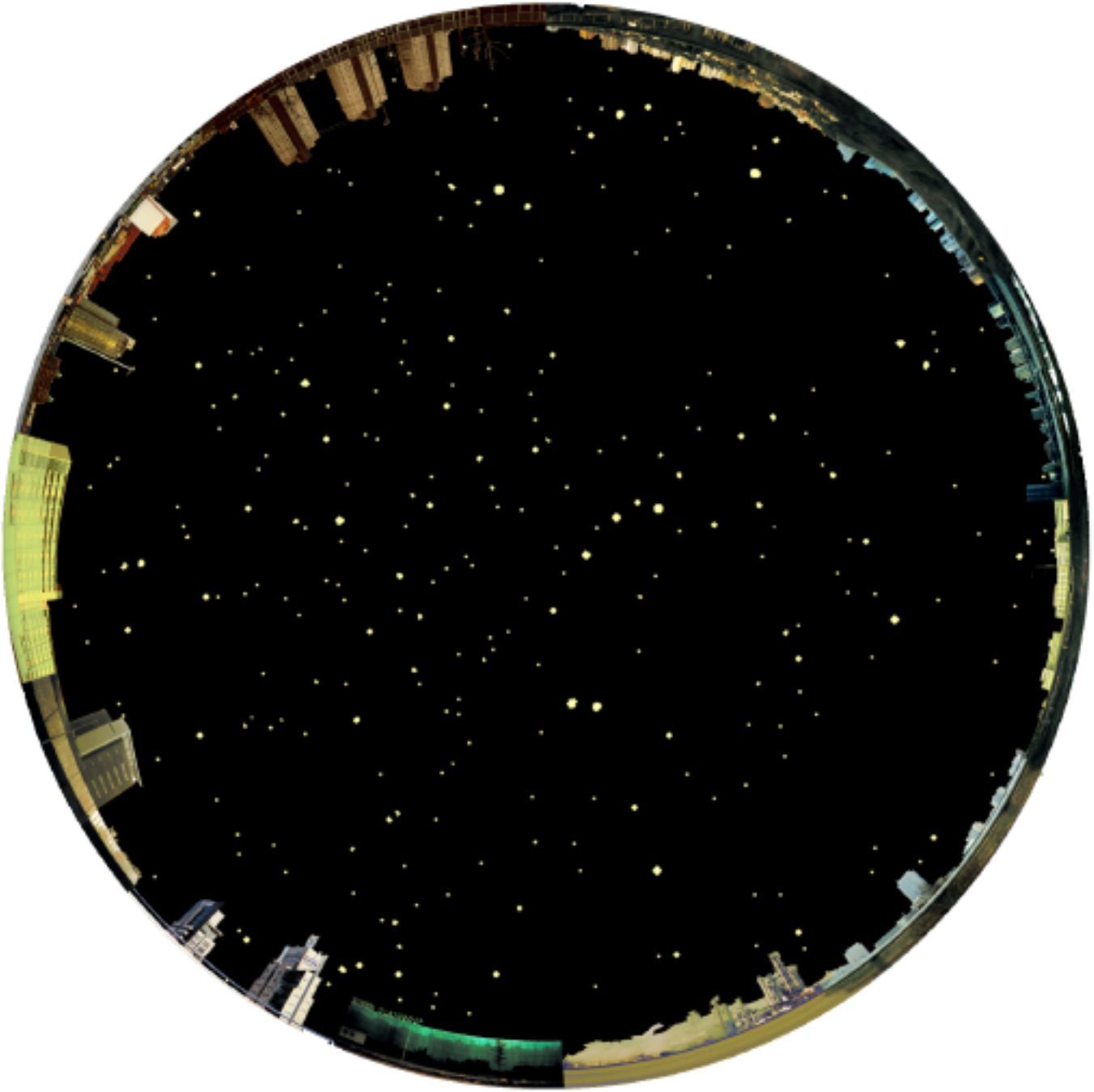
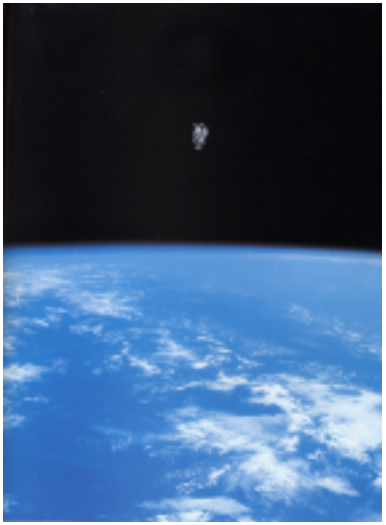


Outer space as traditionally non-functional space



108 Sun Ra and his intergalactic solar arkestra

109 Sigmar Polke: Höhere Wesen befahlen: Rechte obere Ecke schwarz malen!, (Higher beings commanded: paint upper right corner black!) 1969

"Space – infinite vastness." (This is a reference to the German intro of Star Trek. Interestingly the English intro quotes: "Space – the final frontier".) This is the year 2004 and still the gap between imagination and reality cannot be tide over. "Space is the place" – outer space is the fictitious place for visions and utopias of numerous thinkers, artists and scientists. There are no boundaries or limits to fantasies. Fed by myth the universe has become the non-functional visionary space par excellence. It is omnipresent but farer than all retreats on earth. Myth and reality in outer space are hard to separate, thus I will concentrate in the following text on the real conditions of the universe. I don't want to play poker with god with the world in the balance nor do I want to paint images of higher beings. [108, 109] I am not interested in outer space as an option but as a real space, as a "place" – space is a place.

Whenever humans look into outer space, what they project is a reflection of their own existence. The lack of knowledge about the most earth like planet in our solar system has not only created the myth of the Martians over one century ago it also exemplifies the nature of our imagination; one tied to earthly dimensions. Utopias and visions that are projected on the universe are still thrown back as images of our home planet. [1]

The view back on the fragile blue planet has radical consequences in the 70's, not only regarding the beginning of a new environmental consciousness. For most people, the distant images of the universe evoke the need to protect and keep this vulnerable beauty. One realizes that human beings are not needed in this cosmic context. [2]

The romantic view "from a far away distance" covers up the capitalistic and political background of the astronautics projects. This occurrence is typical for the colonialist conquest of places. The motivation of a single

1 Now I know why I am here: to be able to look back on earth. (Alfred Worden, Apollo 15)

2 Reading what astronauts state regarding the distance images, suspicion is aroused, that they either weren't able to express their experiences or they followed terrestrial conceptions.

person is the hope for an improvement of the existing conditions; the real drives are political and economic interests for profit and expansion. This dual structure finds plenty of historical predecessors: the departure for the West, the magical orient or the exploration of Antarctica. [2,4]

The grasp for the stars is complicated by the technical and financial problems of astronautics. The last climax in space exploration during the cold war brings humanity orbital flights and the landing on the moon. Since then we are confronted with the medial omnipresence of space images and we hardly realise, that our role as the distant observer hasn't changed. [5]

The century astronautics begun also leaves us with a broad range of surveillance and control satellites, this view is also earth centred. Weather forecasts, navigation systems and crime prevention are today controlled from orbit. At the same time private investors are starting to discover outer space for its commercial potential. The political, military motivation is expanded by new industry sectors such as advertising and tourism and in the near future the service and construction industry will also be part of this market. The aim is bluntly exploitation and cultivation of spaces in capitalist style. Architects and designers are already working on the realisation of these ideas.

Artists are still envisioned as the substitute players in this game of creation. Furthermore, as in the 18th and 19th century, they are used to create images and ideas, to illustrate these utopias and conceal the real interest to a certain degree. Although a lot of artistic concepts have been the inspiration for technicians and engineers (and vice versa), as soon as any of these planned utopias begin to be realised, the arts are kept out of the picture. Are artists waiting to be allocated a white cube? In the last century artistic practice on earth tried to develop other attitudes and responsibilities towards public spaces and to critically question the existing conditions. It is time that artists analyze and react on the colonialist and commercial tendencies in the conquest of outer space. The experiences and problems with public spaces on earth are expanded into outer space. Maybe we can manage to keep a part of the century old visions of space as a non-functional playground for humanity and realize a piece of real public space in the universe?

2 The assumption that humans exit nature and look down on it now is the illusion that a place of unchangeable infinite legitimacy would be reached, from which we could find out the truth about the nature of earth.

4 Anticipation of astronautics as a metaphor: It is a symbol of freedom, that always consisted of not being tied to earthly things and as if it was a transmigration of souls or ascension.

5 Neutron bombs and intercontinental rockets come from above – and not out of the future.


PEAC

The public space on earth

Public art. Changes in artistic practice in public space on earth.

To understand outer space not only according to the myth of the non-functional space but also as a public space, we have to clarify the earthly dimension of this definition. Only if we can define the universe as a public space using the same criteria as on earth, a public art practice in outer space will be possible.

Art in public spaces – From drop to plop

Artistic positions have been moving out of art institutions and occupying public spaces in the form of site-specific works since the sixties. In addition to the typical "drop" or "plop sculpture", artists like Richard Serra, Robert Morris and Robert Smithson started to work intensively with the space in which the sculpture or the site-specific work is situated. They are reacting to the surrounding architecture or nature in an artistic dialogue. This kind of art in public spaces, that is still practiced today, is operating mainly with the coordinates of static, size and scale. [6]

The site-specificity is only a formal aspect. The individual process of conceiving the idea and the artistic production happens off-site, mostly in the artist's studio. The placement in public space plays a major role. But public spaces with these kinds of placed sculptures, very much resemble the white cube. Public is only their presentation and thus their representation. [6]

6 Whether inside the white cube or out in the Nevada desert, whether architectural or landscape-oriented, site-specific art initially took the site as an actual location, a tangible reality, its identity composed of a unique combination of physical elements: length, depth, height, texture, and shape of walls and rooms; scale and proportion of plazas, buildings, or parks; existing condition of lighting, ventilation, traffic patterns; distinctive topographical features, and so forth.

6 What legitimated them as "public" art was quite simply their site outdoors or in locations deemed to be public primarily because of their "openness" and unrestricted physical access – parks, university campuses, civic centres, entrance areas to federal buildings, plazas off city streets, parking lots, airports.

Art as public spaces – City furniture

In the eighties a process of rethinking public art is started following the discussion about "unwanted monuments" [10] such as Serra's "Tilted Arc". The audience of art in public spaces, the people, who pass by daily and live or work with the art, are becoming more and more the centre of interest for the artists. The public opinion is getting involved and people's need for functional objects and meeting places gains precedence. "Art as public spaces" [6] refers to the design of those places ranging from urban furniture, architectural constructions to landscape environments.

Artists like Siah Armanjani and Scott Burton produce objects and structures for the outdoors, they provide shade and seating, two functions of art that are mostly desired by the users of public spaces. The first collaborations between landscape architects and artists have begun; plop-art continues but now people are allowed to sit on it. [8]

8 Art that either performs a useful task, such as providing shade or seating, or conjures an association with a "sense of leisure" – generic qualities, presumed to be desired and esteemed by all.

This attempt towards a democratisation of art leads to a boom of "Urban furniture as the conquest of outdoor space by indoor space"[111], in which art objects turn to designed objects. A growth in "public" or " publicity" can't be reached through this method. Instead another representative surface is created for marketing companies and cities.

111 Accordingly a city that advertises itself with (contemporary) art in public space suggests that it possesses an above-average number of open-minded citizens and politicians, is modern, open, colourful, future-oriented, and certainly a good place to experience something exciting.

Art in the public interest – Community-based art

New genre public art, so called by the artist Suzanne Lacy [9] expands the definition to "art in the public interest" or community-based art. These artists are dealing with social questions and political activism trying to involve the community. Social, political and ecological problems are the topics that are translated into collaborative art concepts as a communicative process. The chosen communities are often marginalized groups, and it is often criticized that their marginal position within society would be stressed. Other concerns are, especially in countries whose social systems are functioning poorly, that temporary art projects could replace social programs. A hired artist from time to time would be cheaper than permanent social workers. Nevertheless these art projects have the potential to involve the audience in a direct way and to motivate them to a critical approach to their own surrounding and way of life. In some cases such temporary art projects have initiated ongoing and sustainable social programs. [9]

9 Dealing with some of the most profound issues of our time – toxic waste, race relations, homelessness, aging, gang warfare, and cultural identity – a group of visual artists has developed distinct models for an art whose public strategies of engagement are an important part of its aesthetic language…We might describe this as "new genre public art", to distinguish it in both form and intention from what has been called "public art".

One place after another – Flexibility and market demands

Today this way of dealing with public spaces has also becomes an established artistic practice. The institutionalised global art industry is expanding and is continuously looking for a new game and new places. Artists have become collaborating cultural producers and "itinerant artists", [6] who are playing at the global biennales of the world. Mobility and flexibility are key words for today's artist. The "flexible personality" [104] travels from commission to commission reacting specifically to situations and places. Even a critical art practice follows an action pattern: The place is visited and evaluated formally. Its social, political, economical and historical conditions are explored. The possible audience is analysed, and may also be involved in a collaborative way. Together with curators, sponsors, residents etc. a concept is worked out that will be realized. The image of the artist as an avant-garde enfant terrible has changed to the artist as business partner. [6]

Parallel to the permanent growth of international biennales, art in public space becomes a trend in tourist marketing of cities. There is hardly a city, that doesn't have a sculpture park or an art event during tourist season. The "festivalization" [105] of cities profits from the surplus value of art and leads to an increase in quality of a site and to its national and international profile. The myth of the artist as the creative genius and final touch becomes, instead, a new form of abstract decoration. The function of art is still decorative, but now it has become non-material or ideological décor for social, political and economic systems, despite its critical approach. Also critical positions can be marketed. [11, 6]

6 Typically, an artist is invited by an art institution to produce a work specifically configured for the framework provided by the institution. Subsequently, the artist enters into a contractual agreement with the host institution for the commission. There follows repeated visits to or extended stays at the site; research into the particularities of the institution and/or the city within which it is located; consideration of the parameters of the exhibition itself; and many meetings with curators, educators, and administrative support staff, who may all end up "collaborating" with the artist to produce the work.

11 Contemporary art in public space is more welcome today than it was a few years ago because it becomes the topic of cultivated conversation and lifts the urban surrounding in a way that can revitalise an area both regionally and internationally.

6 Site-specificity in this context gains a new importance because it supplies distinction of place and uniqueness of location and its individual identity, highly seductive qualities in the promotion of towns and cities within the competitive restructuring of the global economic hierarchy.

Public space. From the non-functional ideal to a private and administrated space

The development of art in public space follows the discussion about the definition of the terms "public" and "public space". [14] The ideal of an equal space, that is neither an instrument of private nor political or economic interests was and will be a desired image.

The built urban space is determined by the "functional element of movement". [15] The constructed transit spaces are only crossed by people and not used as meeting places. Through ongoing privatisation, institutionalisation, administration and control, public space changes towards a closed system.

Following the model of the shopping mall, public spaces in cities are surveyed and controlled. Additionally the concept of consumption and experience is "cleaning up" urban spaces from their function as meeting places where people would spend time. This is not tolerated any longer and labelled as "loitering". Instead, as a kind of compensation, cultural meeting centres are built as protected interior spaces to give social interaction and communication a regulated structure. [16]

The collective meeting place has given way to urban isolation in a society that has the spectacle as a unifying public element. [13] Art is implemented in the changing process of public space into a built environment. Its ambivalent position is part of the spectacle and at the same time critical observer. [13]

Artists express their criticism and question their own position in this representative game in urban space. I don't want to add to this debate, but sum up some of the quotes from this artistic discussion. Which position does art have inside this constructed "public space"? How do artists define public, leaving aside that part of the public might be their audience? How do they deal with hybrid roles of player in the system and connector to the community? Can public space be re-appropriated through art? [17, 18, 19]

14 We discuss public space because we don't know what it is any more and where public is actually happening and how.

15 In La Défense as well as Lever House and the Brunswick Centre, public space is simply something that is traversed, where nobody stays.

16 In mega cities like Los Angeles or Sao Paolo public access and public interaction was more and more restricted through architecture and city-planning, to avoid incidental meetings of different population groups, and thus a great number of protected and isolated interior spaces were built.

13 Urbanism is the occupation of natural and human environment through capitalism, which can and must transform the whole space into its own décor while developing logically to absolute domination.

17 What is public? Everything that is in public, everything that belongs to the public, everything that is de-privatised and part of public reality. The noun "public" expresses the totality of life, work, buildings, streets, shops, factories, offices and drugstores around which people move and live.

18 Traditionally, one uses the term "public space" when something is installed outdoors – in the streets, squares, or parks – that is, in places belonging to the city, the state, or the federal government. Public space is not the same as being in "public".

Parallel to this public art discourse the conditions of public spaces are changing through the increase of "inner security". Surveillance cameras protect not only closed systems like companies and their courtyards; they are furthermore serving generally to "reassure" the users of public spaces, thus transforming them into closed systems. [11]

The ongoing boom of closed areas like gated communities confirms the tendency that citizens give up their individual freedom to gain more security inside protected and controlled systems. This phenomenon of private retreat is influenced by the media-produced fear industry. Furthermore the irritation and insecurity produced by terror warnings that have been occurring periodically since 9/11, has lead to the sealing off of urban centres by police and official advice being given to avoid crowds and major public places. One could almost speak of a "depublicization" of public space. [20]

The increase of restrictive control functions happens parallel to the growing popularity of art as a new tool for the new definition of cities. Art in public space becomes the signifier of "depublicized" space. One could cynically say the role of art is to cover up these facts and to work as a reconciling element.

19 Public space is made and not born. In cities "public space" is a production by a government agency (in the form of a park) or a private corporation (in the form of a plaza in front of an office building, or an atrium inside the building). What is produced is a "product". What is produced is a "production": a spectacle that glorifies the corporation or the state, or the two working together. Public space is a contract: between big and small, parent and child, institution and individual.

11 Public space is actually a fiction, all the users pass unchecked through the invisible access barriers which they don't realize them directly.

20 Exactly here, it is clear that art follows non-public interest, as it is designed to suit the criteria of (well-endowed) private and state competitions. It doesn't actually make a public – related to public – contribution, access is confronted with a lack of attention.

Outer space as public space

What does that have to do with outer space? Following the complex debate about the instrumentalized and "depublicized" space on earth you might consider the demand for art in space as a romantic escape to the stars. But my approach to the perception of outer space as public space doesn't stop in theoretical and rapturous ideas. It tries to find out, considering the changing conditions, if outer space will develop in the near future from a traditionally non-functional space to an earth-like public space or if this already happened. Not to mention that the transformation of outer space into a political and commercial space has a direct effect on the public space on earth, among others because it can be controlled even better from orbit.

The fable of the astronomer, who falls into a pit while looking in the sky, has to be rewritten since the moon landing and the expansion of earthly powers into the universe. [4]

Not only formal elements like scale, size and appearance have to be redefined, but also the understanding of scientific realities that have been known for centuries; the shock of new revelations can't be overcome that easily. [21]

Today we can hardly imagine the startling moment in front of the sublime TV-image of the moon landing. We can't understand how it did not even affect our behaviour regarding a sustainable protection of the blue planet. Even worse we advance into space with the same "après moi la deluche" (after me the abyss) attitude and have already caused major pollution and waste problems.

As the pictures of the moon landing were watched on television and not under a clear starry sky, the position of the public shifts the perception of

4 The Thracian maiden derided the stargazer. He would know everything about the things in the sky, but nothing about what lies in front of his own nose. Thus he had to tumble..

21 Despite the fact, that we now, for the first time, realize with our own eyes the Copernicanian degradation of the earth, that we have known – but only known – for a long time, despite this fact the fascination with which we stare at the earth instead of watching our destination, the moon, is in fact an anti-Copernicanian element itself. The sight was shocking; this trauma won't heal quickly.

outer space into the interior. The myth of a public outer space is therefore true in a double sense: The democratic "roof" of cosmic space remains the non-functional projection screen of utopias and dreams. At the same time it becomes the real action ground of a global competition, happening outside, but brought into the living room of millions of people. [4]

Grasskamps definition of public space divides nature as a sublime, original space from the built environment of modern cities. Public space in urban contexts is defined by "user frequency, accessibility, functional diversity, vividness and complex design". 11 These criteria would define outer space as expanded cosmic nature, comparable with non-visible public spaces like the media or the Internet. Grasskamp ignores that meanwhile virtual worlds have the same presence and reality as urban spaces and can be marketed similar to earth-bound public spaces. Although the space universe has a big telepresence and is of public interest, it differs from public space on earth. There is neither an architectural frame nor are there any spatial boundaries. [11]

The premise for the existence of an earth like public space is the intervention of civilization into an existing natural context that leaves visual capitalistic structures. Ownership, possible marketing, representation, image and influence play a major role in the implementation. Following the logic of the infinite expansion of capital, occupation of outer space must be the next step after the globalisation of the earth. [16]

How far has this expansion progressed already? Can the site outer space comply with all private, commercial, political and economic interests and are the prerequisites set? What is left of Kennedy's idea to awake the "old pioneer spirit" with the landing on the moon, to make them [the Americans] greedy for "New Frontiers" and to give them a "shot in the arm"? [21]

4 Next to sports and armament, the race for space became its own kind of delegation that is strengthened symbolically in relation to the absence of delegates.

11 The frequently asked question, if mass media and internet would expand public space or even replace it, including swimming-pools, public transport and museums or even amusement parks, shows an insecurity in definition and utilization that is ignored when dealing with art. The language of public space becomes suddenly precise taking its explicitly spatial reference seriously and relating it to settlement, geographically blank and architecturally bound areas. However it would be comparatively senseless to designate a forest as public space – as actually everything, that lies outside the settlements especially the cities, figures more as landscape or environment.

16 Capital is an organism that cannot preserve other than through permanently looking through its borders and subsist on its outer surrounding. The exterior is essential to it.

Political interest and militarization

A short historical look back

Without question outer space is a political space. A short review of the history of astronautics seems to be accurate, as it gives artists, which use this hand book as a tool for inspiration, a brief view of the intentions, that stood at the beginning of the development of outer space into a public space. Not only the Cold War has made outer space the scene of global armament and a power competition that expanded out of the realms of this planet. Earlier, the National Socialists have already discovered the potential use of astronautics for war. The retaliatory weapon V2, developed for the Nazis near Peenemünde by Wernher von Braun and Co, has mainly focussed on the moment of falling down to earth. The rocket almost reaches outer space and then on its way back it destroys parts of London or Belgium. [28]

Prisoners of the KZ Mittelbau, which has been part of the Außenkommando Dora in the concentration camp Buchenwald on Ettersberg Mountain near Weimar, have built the so-called "wonder weapon". Because of its potential as a weapon of mass destruction and the inhumane horrible circumstances of its production, Rainer Eisfeld calls the Third Reich the " cradle of astronautics in the spirit of barbarity". [29]

The military instrumentalization of astronautics continues directly after the end of the Third Reich and the capitulation of Germany. The space pioneers surrender to the Americans in 1945 and the Cold War becomes the motivation of new sponsors. [30]

The involvement of the engineers and scientists in the NS-regime is obviously ignored in the USA in order to profit from their knowledge in the race for superiority in outer space. The Cold War transforms the universe to the real scene of a military competition for power, that doesn't stop with the armament of the nations on earth. [30]

Consistent with Kennedy referencing the "New Frontiers" as a slogan for his presidential election, astronautics is extended as a new strategy in the global power game. The American president uses the myth "outer space"

28 Once the rockets are up, who cares where they come down? That's not my department, says Wernher von Braun. (Tom Lehrer)

29 The German space travellers see their homeland as the cradle of astronautics, but they have the problem that the rocket's former fame can't be separated from its historical context, National Socialism and the piles of corpses in Mittelbau-Dorau.

30 By the end of the year more than a hundred German rocket scientists and engineers were in White Sands, N.M., having delivered themselves to American troops, if only to avoid being taken by the Soviets.

30 The race is on

26 With it Kennedy assigns the mythologically charged longing of the Americans for the virgin land in the West from the nineteenth century to the space age.

29 Rocket technology as well as astronautics in general is domination technology in principle.

30 Now the Soviet plan was clear: They were going to put a man on the moon! Maybe colonize the place!

30 No one can predict with certainty what the ultimate meaning of mastery of space will be – it may hold the key to the future on Earth (Kennedy 1961)

30 One small Step for (a) man, one giant leap for mankind

30 They planted an American flag, stiffened with wire so that it would "wave" in the lunar atmosphere. They were, emphatically, not claiming the land for the United States

as the motor for his politics of expansion and promises to lead the pioneers to the unexplored distances of the universe. [26] The same imperial gesture, that has colonized the countries on earth for centuries, is continued in outer space. Thus a first major step is made from the development of a non-functional utopian space to a space of political and military interest. [29]

On the Soviet side the same strategy can be found, with the difference that "the Russians" were usually faster. The Sputnik shock has shaked America and started the race for the moon, as if territorial rights had to be claimed, everything in the service of freedom for humanity. [30] Supremacy in outer space would secure supremacy on earth. The strategically planned media event, the moon landing, brings America world fame and helps to win back the self-confidence of a nation. The whole (Western) world nervously witnesses the Eagle landing. The American "good" wins over the Soviet "evil". [30]

The astronauts arrive as messengers for humankind and as a sign a plaque is placed on the moon, which reads:

HERE MEN FROM THE PLANET EARTH FIRST SET FOOT UPON THE MOON IN JULY 1969 A.D. WE CAME IN PEACE FOR ALL MANKIND

600 million people in 47 different nations have watched the first steps on the moon. Never before had a fictive land claim has such a big audience. [30] The heading of the BILD newspaper on the 21st of July 1969, the morning after Armstrong's firsts steps on the moon, is promptly titled: "The moon is now a Yankee".

The question, "if this land was occupied in the name of humankind or of one nation" is crucial for the definition of outer space as a public space. Two years before the Americans have signed the UNO "Treaty on Principles Governing the Activities of State in the Exploration and Use of Outer Space, including Moon and Other Celestial Bodies" [23]. This UNO-treaty says that outer space is a "province of all mankind", and that no nation can claim this property. All nations have full-unlimited access to all celestial bodies, research is free, the ownership of moons, asteroids and planets is forbidden. The international state community discusses alternative models for the landing on the moon, for example to hoist the flag of the United Nations or miniature flags of all countries of the world in

the moon sand. The American government decides a symbolic action: Only the compromise between the imperial gesture of hoisting a flag and the positioning of the astronauts as messengers of humankind sealed by the placement of the plaque, avoids a breach of trust.

Today the Outer Space Treaty of 1967, in combination with the Moon Treaty 1979, still controls the military use of outer space. [25]

Space warfare today

The Cold War leaves us with a military satellite network covering an area that continues to enlarge up until the present day. Since the sixties, so-called Keyhole Satellites have been taking photographs of the earth surface with increasing quality "in visible light, infrared and multispectral wavelength". [3] Military operations on earth are not only strictly monitored, moreover as part of a new "space warfare" they are strategically controlled from the universe. [3]

With the progressing increase of inner security today's satellites offer the perfect instruments for the surveillance of public spaces. The near earth orbit becomes the expanded control space of earth. These attempts in the fight against terrorism aggravate the situation in the universe.

A look forward into the future of space warfare shows an even more drastic image. Government-owned satellites could be a target of terrorist attacks and thus have to be protected. [3] One step further, self-protecting mechanisms on satellites could develop into self-defence weapons. A totally new means of warfare from outer space could introduce a new stage of aerial warfare. [3]

A report of the UNO committee on the peaceful use of outer space from 2001 already raises concerns about the military occupation of outer space and whether this "weaponization" is contradictory to international agreements. [22]

Political competitors are bringing fresh air to the continued fight about supremacy in outer space. Last October China joined the manned astronautics nations and follows the trend in national demarcation by adding the term "taikonaut" to the already existing terms astronaut and cosmo-

25 Moon treaty, Article 3, 1. The moon shall be used by all States Parties exclusively for peaceful purposes. 4. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the moon shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration and use of the moon shall also not be prohibited.

3 The superpowers agreed not to place weapons in space, but they launched every other part of the gun. By deploying spy satellites, military forces gained the capability to select targets and guide "smart bombs" toward them. Analysts reviewing satellite data counted enemy missiles, tracked troop movements, inspected military facilities, and verified weapon reduction agreements.

3 Ground-based lasers can blind sensors on optical spy satellites. Technologically sophisticated countries can launch "killer" satellites that collide with their robotic foes. Nations with less money can launch buckshot into space to collide with a 17,000-mile-per-hour spy satellite and destroy it.

3 If the military deploys lasers and kinetic energy rods, which is likely, these weapons will not be targeted at satellites alone. Space-based lasers can hit targets on the ground.

22 Some delegations expressed the view that a trend towards "weaponization" of outer space and towards an arms race in outer space was becoming more obvious.

naut. America's answer followed promptly: In the process of his election campaign president Bush re-enacts the "Kennedy-moment". With a mixture of political strategy and propagandist use of the nation-unifying experience, the power fights in space are continued. [7]

The new "old" Europe seals its progressing transformation into a nation state with politically competitive projects like Galileo. As well as the little discussed sister program GMES, which serves global environmental and security interests, and in this way will become a political instrument to secure the "fortress Europe". [29]

The race is still going on! International collaborations like the ISS can't mislead the fact that outer space is actually used for national political interests. [12]

The motivation for international teamwork is primarily the financial part of the conquest of space enterprise. Remedial measures could be taken by the emerging and increasing commercialization of outer space. But economy might unexpectedly help the bankrupt governments out. More and more economic interests are extending political and military interests. But, in the long run, this would direct a change of outer space law; it would continue the privatization of outer space not only symbolically, but also in reality. Only then, the old pattern could follow: Public space is conquered militarily, then civilized and to make a civilization possible, the economic infrastructure has to be built. [3]

7 A reason for the American urgency could be European and especially Chinese space programs. Shortly after the reports about Bush's new space initiative China announced to expand its space program as well. A Chinese newspaper reported that, after the successful flight of the first taikonaut last fall, a space ship with several board members will travel into the universe in 2005.

29 GMES – so politicians hope – will be able to control the movements of refugees which appear more obviously from all over the poor areas of our world towards the fortress Europe, that tries to block off more and more strict access to its interior.

12 We'll invite other nations to share the challenges and opportunities of this new era of discovery. The vision I outline today is a journey, not a race, and I call on other nations to join us on this journey, in a spirit of cooperation and friendship.

3 The most dramatic growth in space spending will not arise form government treasuries, however. It will come from the private market. The year 1998 proved a landmark in that regard: according to the best estimate, commercial space revenues exceeded government spending worldwide for the first time.


NASA

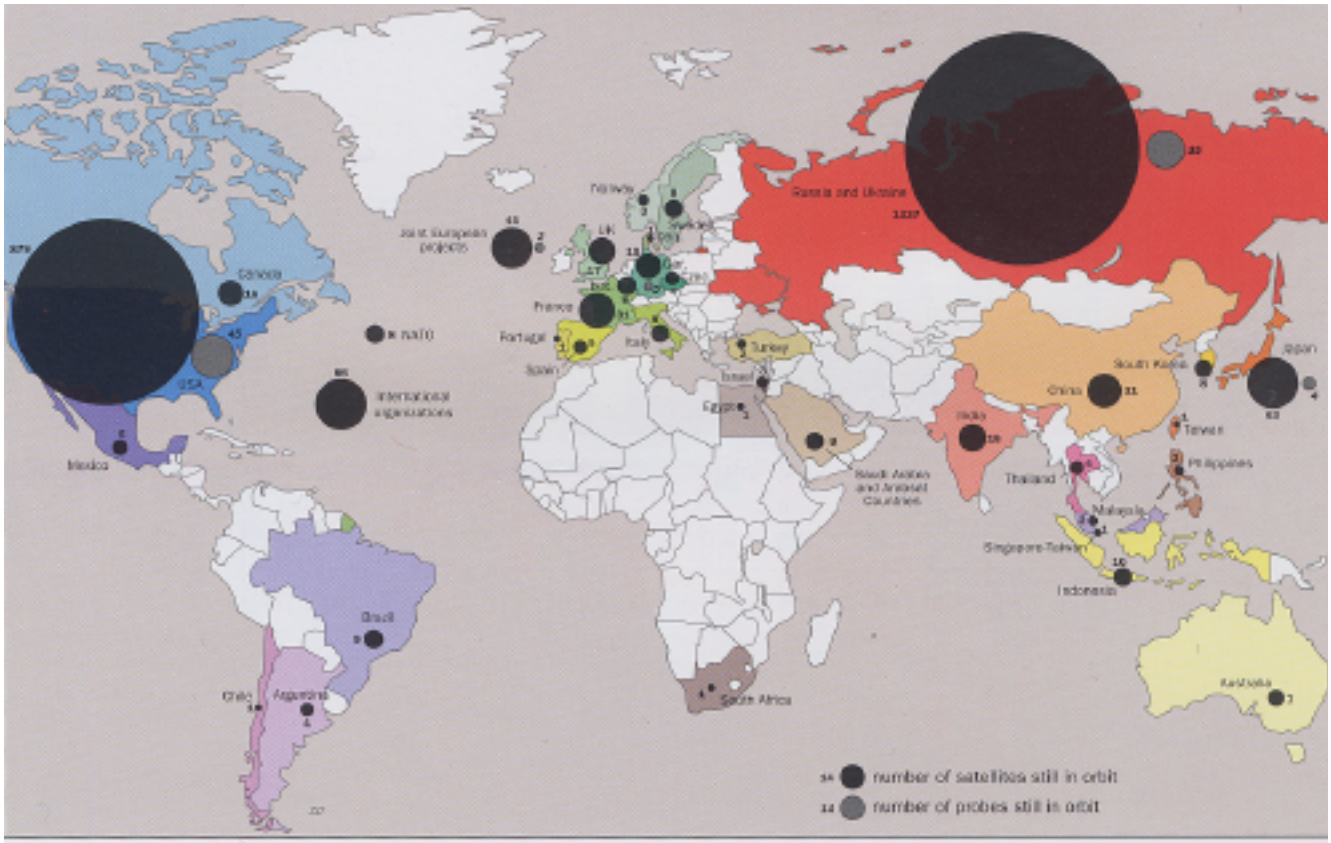


Figure 4.14. **Satellites and probes in orbit on 1 January 2000.**

Economic interests and commercialization

The picture of the huge Coke advertisement sign on the moon or in space is part of the collective memory of humankind long before its realisation. The realization of this imagination would be possible today. Already, Russian cosmonauts have already filmed inflatable Pepsi-cans floating in orbit for an advertisement spot. [4]

The myth of outer space becomes a brand that is used today for plenty of commercial purposes. The transformation to tourism and mass production will inevitably happen shortly. The site "outer space" becomes a promising action space for economic interests. Politics paved the way and changed the setting from utopian non-functionality to a powerful capital investment space for the future. For artistic practice this means a radical change, because commercialization opens up real possibilities for projects in outer space in the near future. Art could get the possibility to dock on.

Numerous terrestrial advertisement campaigns use the profit making effect of the longing for the universe. Recently GEO called for entries for moon ads: From Bounty to Nivea and Doppelkorn (a German Schnapps) – one can make business with the moon. The two winning propositions are amazingly the two most political: The International Society for Human Rights pictures a moon behind bars, and Emma (a German feminist magazine) replaces Armstrong's legendary foot print in the moon-sand with high-heel imprints.

While these advertisements are dealing primarily with the idea outer space, the commercial reality of outer space appears different. Economy follows the military industry and more and more purely commercial satellites are launched in addition to the already existing military satellite network. New branches and services that are located in near earth orbit extend the globalization of the economic world. [3]

4 You can't escape coke bottles and cigarette brands, no matter how deep you advance into the Sahara or how close you approach the poles. As soon as this thought reaches the poles, it will be ready for the next step, the only logical step that can follow in the middle of the seventh decade: They will probably be the first traces of humans to be left on the moon.

3 Want to make money in space? The commercial space sector may well become a trillion-dollar-per-year activity by 2050.

Our modern civilization is dependant on a range of satellite services. Weather satellites like Meteosat are irreplaceable. They predict if it rains or snows tomorrow and they help to coordinate and prevent natural catastrophes. Radar satellites like Envisat or ERS observe earth and ocean surfaces, send data about the expansion of the ozone hole and provide exact maps of the earth. The collected data is used by the GIS (geographic information system) to predict natural disasters, determine resources, and for town planning. Satellites are also providing important information for crisis and disaster management. The surveillance apparatus above our heads also has peaceful purposes.

With the boom of the telecommunications in the nineties numerous private commercial satellites are launched. They help make today's modern life very different and appealing – from the "global village" to satellite television. [32] Commercial satellites also provide high-resolution images of earth's surface, which are sold for promotional purposes or advertisements. Also the International Space Station points on commercialization and economic development of the earth's orbit, as stated in the Commercial Space Act 1998. "The road is prepared" – the doors are open for a further commercialization of the universe. [102]

32 In the case of a telecommunication satellite, that operates for ten years five days a week and eight hours a day connecting telephone conversations between the UK and the US, the estimated costs for purchase, insurance, launch and operation are only 1,8 percent of the expected proceeds.

102 The Congress declares that a priority goal of constructing the International Space Station is the economic development of Earth orbital space.

Commercial satellites also provide high-resolution images of earth's surface, which are sold for promotional purposes or advertisements. Also the International Space Station points on commercialization and economic development of the earth's orbit, as stated in the Commercial Space Act 1998. "The road is prepared" – the doors are open for a further commercialization of the universe. [31]

31 Our aim is scientific excellence and a stronger partnership with industry where clear economic perspectives are given – for example in robotics, radar satellites or projects like Galileo. The latter will build a global satellite navigation system by 2008 under German leadership and is economically one of the most promising large-scale enterprises in astronautics.

A combination between remote sensing, GPS or Galileo and the Geographic Information System brings a revolutionary change to the farming industry. Space Age Farming or "Farming by the inch" tries to provide precision cultivation that can be adjusted exactly to soil conditions, weather, insect infestation etc. Via computer and navigation system the necessary applications are determined for the farmer.

Another branch, that profits from commercialization of outer space is the transportation sector: The Federal Aviation Administration describes this development on their homepage: Before 1980 there was practically no

commercial "Space Transportation Industry". After the launch of several commercial satellites that are independent from government, this branch of trade has developed today into a prospering business. [33]

Other near earth services in the near future can be imagined, for example a One-Hour-Delivery of important worldwide shipments of high value and/or limited life, like electronic devices or transplant organs. [3]

There are plenty of future visions about the commercial development of the universe. A lot of them stay un-realised because the costs are still too high. According to NASA the cost of transporting 1 kg into space is 20,000 US dollars. Despite the big risks for such an investment in the future, numerous companies especially in the US already offer promising business ideas for the earths near orbit and existing or future space stations. [3]

Entertainment in the universe - Space for all or profit for a few?

Some enterprises have been trying for some time to cooperate with government controlled space agencies to open up outer space for the entertainment industry. It is strange that, especially in America, they are confronted with a lack of willingness. The Russian space agency is more open in this regard and equals the small state budgets with commercial business and private investors.

A good chance to avoid state dependence could be the X-prize, a private enterprise funded in 1996 by the space physician Peter Diamandis. The X-prize could pave the way for commercialization and broader access to the earth's near orbit. The prize is endowed with 10 million dollars. The competition is targeted towards developing a transportation vehicle that could speed up civil astronautics: "A privately funded team must build and launch a spaceship capable of carrying three people. The spaceship must fly to an altitude of 100 km and return safely. The same ship must repeat the journey within two weeks." [34] Young dotcom millionaires who are searching for "new adventures" largely support and promote this project. [34]

Twenty-three teams have applied so far, among them Starchaser Industries, Manchester, England, with a 37-foot solid-fuelled-rocket; Armadillo Aerospace from Mesquite, Texas, with a computer-controlled,

33 Events of the 1980s – including the birth of a European commercial launch services organization, recognition of commercial space transportation's value by U.S. government officials, and the ban of commercial payloads from flying aboard the Space Shuttle after the Challenger disaster – promoted the development of this industry in the United States.

3 A potential market for very rapid delivery does exist among high-value, low-weight parcels: electronic devices, organs for transplant, biomedical instruments and commercial documents.

3 Operations centered on the International Space Station could open space to humans in much the same way that forts on the American frontier forged links between scientific curiosity and capitalism. As this occurs, the role of the government will become less dominant as private entrepreneurs fill the space near Earth.

34 Look, you're never going to beat Bill Gates at his own game. But if you own the first successful space-mining company, you'll make him look like a pauper (Peter Diamandis)

35 Delivered to the Moon surface in a special capsule will be your certificates, business cards, cremated remains, jewelry, artwork and many other items of choice. The Trailblazer® satellite will deliver commercial and scientific projects and experiments to lunar orbit, as well as conduct lunar exploration and mapping.

36 Corporations can film their products and services being used on the space station as RadioShack did in 2001 with its Father's Day commercial.

hydrogen peroxide-powered vehicle and Canadian Arrow from London, Ontario, with – attention – a modified V-2 rocket. The most promising participant in this competition might be Burt Rutan, head of the company Scaled Composites, who has been developing several prototypes since 1974, among them the voyager vehicle. For the X-prize he constructed "White Knight", which is lifted by 'Spaceship One' to a height of 16 km and continues with its own engine to reach 100 km.

The deadline for the X-prize is January 2005. If this enterprise works, it would lend wings to a range of business ideas that are just at their start.

The Californian company Transorbital is designated, on its website, as the "first commercial venture on the moon". A probe is sent to the moon in April or May 2004 from the Russian space centre Baikonur and is transported with a modified Russian intercontinental rocket. The probe Trailblazer sends back live video stream material of the whole trip to the moon as well as high-resolution images of earth and detailed maps and images of the moons surface including the Apollo landing sites. Additionally Trailblazer functions as the first delivery service of small, lightweight objects to the moon. [35]

On Transoribtal's website objects can be registered to be shipped to the moon in an unbreakable titan capsule. Cost per gram: 2500 dollars. A cheaper solution is to send small texts and messages that are burnt onto CD for 16,95 US dollars per 300 letters. This could be a potential possibility for artists to place little works on the moon; but this would stay literally on the level of a drop sculpture and is only partially adequate as critical art practice.

Another space probe with space-tested video cameras on board will collect material from the moon for the company Lunacorp, material that can be marketed for movie trailers, advertisements and video clips. The parts for the probe SuperSat are sent to the ISS, put together there and continue to travel to the moon. Lunacorp has been working together with the ISS for some time. An example of their work is a Radio Shack advertisement from 2001 that was captured on board the ISS. [36]

Edwin "Buzz" Aldrin promotes Lunacorp and the privatization of the universe. [37] The X-prize could make outer space affordable for more people. "Access to space " and "space tourism", are often used synonymous-

ly. The development of public outer space is connected strongly to its commercial marketing potential. The correlation between "space for all" and "space as capital" is mentioned over and over and lies in the logic of capitalist societies in the sense of "I consume, therefore I am". The difficult discussion about public space on earth almost is ignored and no similar critical debate has been started so far regarding outer space.

37 For the further exploration of space it is important that it becomes an economical space – and that the public participates more. (Edwin "Buzz" Aldrin)

Space tourism – Democratic vehicle or elitist luxury

The commercial use of manned space flights as a tourist attraction promises to become a profitable sector of the economy. [3]

3 If scientists and technicians can travel to habitat modules in the heart of this orbital research park, why not dedicate housing to those travelling for pleasure? Indeed, that was the premise of MIR Corporation, the international company that planned to use the Russian Mir space station as a hotel for high-priced vacations.

The Mir-Corp is one of the important mediators between companies and the Russian space agency, the only one that is completely open for commercial uses. It became well known with media events like the first space tourist, Dennis Tito in May 2001, who bought a flight to the ISS in a Soyuz-capsule for 20 million dollars, which included a one-week stay. Pop star Lance Bass had been announced as the second space tourist, but this had not been actualized. Instead South-African dotcom millionaire Mark Shuttleworth travelled to ISS. With the profit from selling his company he finances this private experience and uses it back on earth for his pedagogical mission as a mediator and educator regarding questions of astronautics and outer space throughout Africa. In 2004 MirCorp announced to build a small space residence called "Mini Station 1" for three travellers, who can stay up to 20 days. This venture also goes hand in hand with the X-prize competition.

The company Space Adventure in Arlington, Virginia, is planning trips into the near sub-orbit of earth at a height of around 100 km. For 98,000 dollars applications can be sent in already; the flights will start in 2005 / 2006, also timed with the X-prize decision.

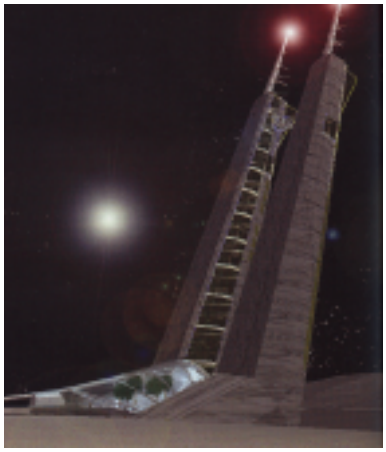
Space Adventures are not the only offering sub-orbital travel. Also terrestrial space amusements can be booked: At the Yuri Gagarin Space Center in Moscow's Star City, Swjodsnij Gorodok they offer cosmonaut training including Zero G or parabolic flights, Soyuz simulator training, centrifuge training and neutral buoyancy-hydro lab space walk or maybe the high altitude jet flight adventure pack – there is a lot to experience! 30 seconds of weightlessness or a pilot fighter feeling. By the way, several artists

38 Anderson is not the only one who considers the future recreation areas beyond the stratosphere as a lucrative market with astronomical profits.

3 The commercial market for such activities is the entertainment dollar.

38 "Orbital Hilton" as a "cruise ship in universe"

39 The Space Island Project will incorporate technologies, vehicles and procedures developed by NASA and Aerospace Companies over the last 25 years to create a stand-alone, commercial space infrastructure supporting the broadest possible range of manned business activities in Low Earth Orbit (LEO) 400 to 500 miles above Earth.



already use the Gagarin Space Centre for experiments and projects in Zero G. The ESA is also offering parabolic flights but only for scientific purposes.

Mainly commercial ideas play a role in the latest plans of EADS Space Transportation Bremen. By 2007 they want to modify a Russian military jet and add a glass cabin for 12 people. Flights are planned to Mallorca with space touch. It sounds like a bad joke about the German tourist invasion in Mallorca but it is meant seriously. It signifies the mass market that is targeted by this venture. [38]

An inquiry of Daimler-Benz Aerospace from 1995 finds a potential of 450.000 space tourists in Europe with a yearly turnover of approx. 20 million dollars. [38] NASA's space tourism poll showed similar results in 1997. The company Futron conducts research for NASA about possible commercialization of space. Tourism and satellite technology are the markets with the best growth predicted in the next years. [3]

The new boom in extreme tourism is "space voyages for fun and profit". Plans already exist for hotels in near-Earth orbit. They should circumnavigate earth similar to a space station: Gene Meyers, president of the Californian Space Island Group, wants to build a space hotel by 2012 with luxury suites, an amusement program and public telephones. [38] The visions of Space Island Group continue: Their website shows a concept for a city in space that is reminiscent of Kubrick's 2001 – Space Odyssey. [39]

A survey that the Deutsches Zentrum für Luft- und Raumfahrt DLR (German Centre for Aerospace Travel) made for the ESA in 1998, considered the realization of a space hotel suspended in the air not possible before 2020. The price per night would be 50,000 Euro. The inquiry also stated that tourism on the moon could not begin until 2050.

British architect Peter Inston, has planned a moon hotel for the Hilton International that is "larger than the MGM Grand, Las Vegas, a five-thousand-room structure of domes powered by solar energy and utilising water taken from lunar ice." [3]

The hotel is imagined as a gigantic leisure centre with swimming pools, wellness areas, amusement parks and restaurants. Another draft for a Lunar Hotel was done by Utrecht architect Hans-Jurgen Rombaut. Here

again, the moon is perceived as a fun planet: All rooms have earth views, swimming pools and weightlessness rooms for jumping around and experiencing the different body feeling. A holiday on the moon will be a short trip: One moon day is as long as 14 earth days. The question is, if the bill has to be paid for a 1 or 14 days stay? [38]

38 Travel to the moon will be possible. The market is there the offer will be made. (Eric Anderson)

Travel to the moon would be worth a Sunday afternoon trip. Travel agencies have thought about that for a long time. As early as 1954 Thomas Cook opened a "moon register" to take reservations for moon voyages. For those who want to get information during the terrestrial waiting phase I recommend the travellers guide "Reisen zum Mond" (Voyages to the Moon) with tips for souvenir hunters and excursion plans. 'Geo Special' offers five moon routes for different degrees of difficulty and interest. [40]

40 1. For the bourgeois: Looking for probes around the Apollo-11 landing site, route length 140 km. 2. For the climbing enthusiast: Scrambling in the Tycho crater, route length 75 km. 3. For the mystic: Chasing lights on the Aristarchus plateau, route length 60 km. 4. For the extreme sportsman: Expedition through the basins of the South Pole, route length 200 km. 5. For the nostalgic: Searching for the geologist's hammer, route length 35

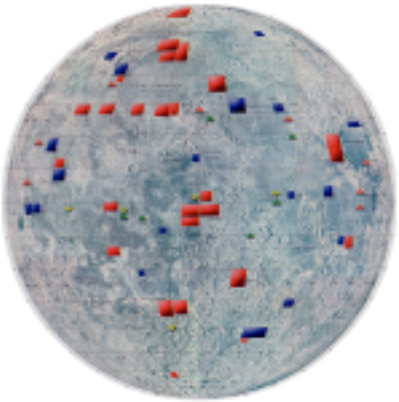
Greetings from "The Hitchhiker's Guide to the Galaxy". I am not sure yet if the meaning of life in space will definitely be "42". [90]

My small house on the moon – Property and ownership in space

The American Dennis Hope has achieved another successful coup in space marketing with his company the Lunar Embassy. I want to describe this commercial venture in more detail because several already existing art projects include extraterrestrial property. Since the eighties, Hope has sold land on the moon including ownership documents, a moon map and a moon passport. One acre of land costs only 20-30 dollars. For 4.500 dollars you can buy lunar cities "for development by the purchaser". All the pieces of land are on the side of the moon facing earth. Land on Mars and Venus is also offered. The web-based company counts on the "pioneering spirit" of its customers and has already sold over 2 million pieces of land to private individuals and companies, e.g. hotel chains like the Marriott and Hilton. [41]

41 Over the past 23 years, Hope estimates he has made $6.25 million selling land on the moon and the planets, primarily Mars and Venus.

There are limitations and restrictions for prominent areas like the Apollo, Viking and Pathfinder landing areas, the "face" and the "pyramids" on Mars, as well as the moon craters, that contain water. [42] NASA has sovereignty and can land wherever they want. But property owner can take legal action against commercial enterprises on one's land. In 2001 Hope announces a galactic government and will send a CD containing his claim



44 The sale of lunar property has been ongoing for twenty-four years by the Lunar Embassy, which is THE ONLY COMPANY in the world to possess a legal basis and copyright for the sale of lunar, and other extraterrestrial property within the confines of our solar system.

43 "From now on the moon shall belong to thy".

45 Novelty gift: something new and unusual and 2) a small mass-produced article such as a toy or trinket

25 Article 11. 3. Neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non- governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the moon or any areas thereof. (...) 7. The main purposes of the international regime to be established shall include: (...)

of ownership to the moon with the Trail Blazer probe.

How can somebody sell property on planets that according to the UNO treaty are "common heritage of mankind"? [23] In the case of the Lunar Embassy the question of proprietary rights in outer space seems to be more urgent than for other commercial ventures. Dennis Hope's extraterrestrial property refers to an old American law, after which ownerless land can be claimed by anybody. Making use of this law he registered the moon and then all other planets of our solar system in his name at the San Francisco County Seat in 1980. Since then the Lunar Embassy calls itself the legal owner of extraterrestrial property. [44]

Also Martin Jürgens, a German pensioner from Westernkappeln, Westfalen, claims ownership on the moon. It has belonged to his family since the 15th of July 1756 when the Prussian king Frederick the Great has donated the moon to one of his ancestors for special merits. The donation is sealed with a document. Unlike Hope Jürgens doesn't take advantage of his "ownership". [43]

Although Hope insists on his ownership, all these ventures can be stated as gadgets. Reading between the lines you find out that the company protects itself from complaints of non-satisfied, "expropriated" customers: The pieces of land are called "novelty gifts", thus the moon document becomes only an idealistic toy. [45]

The self named "head of cheese" is obviously leading us up the "moon" path, nevertheless he targets the problem of privatizing space: Who owns the proprietary rights in the case of private or commercial exploitation of resources on the moon or the planets? The UNO treaties form the basis for a further commercialization of outer space. The Institute of Space Law ISL is working on proposals how to deal with claims of ownership similar to the Lunar Embassy's, but they admit that the state communities need to urgently clarify, if they want to "open the legal way to the moon and encourage private investors". [43]

The Moon Treaty from 1979, together with the Outer Space Treaty 1967, governs private law and state-law proprietary rights in outer space. Up until now it has been ratified only by Australia, Austria, Chile, Mexico, Morocco, the Netherlands, Pakistan, the Philippines and Uruguay. The space faring nations act with noble retention. The reason is article 11. It

specifies that all parties to the contract have to agree on its utilization. Sharing any gains doesn't suit economic standards. [25]

Hope's moon and planet occupation is based on a loophole in the UNO treaties. The Outer Space Treaty from 1967 only defines governmental possession titles. Later the Moon Treaty in 1979 clearly included private and "non-governmental organizations", but still only nine member nations of the UNO ratified this treaty. [44]

As long as the treaty is not ratified by the entire international community, the future of the commercial sectors remains unclear At the same time the UNO recognizes, in the statements and proposals of a meeting from 2001, changes in space activity and envisages new financial investors. [24] Only a modification of the treaties could give the starting signal for utilization of the resources in outer space and colonization of planets.

While Hope is waiting for further development on the private economic sector in outer space, he follows an interesting marketing strategy that could also catch critics of space commercialization. An activist lobby of private property owners will organize to resist big companies that want to occupy the moon for commercial purposes. The formation of this lobby could get a lot of media attention, as a "David against Goliath" – fight for space's future-history. [42]

Economic site factors - Industry and outer space

Let's leave Hopes space activist dreams and turn towards the visions of economy. The precondition for an economic expansion into space is above all the clarification of property rights. These are the obstacles for new investors in their attempts to encourage enterprises in space. [3]

The New Frontier mentality is deeply embodied in entrepreneurial thought. For years, new models have been developed to be able to use the site factors that the moon and other planets or asteroids offer. The plans range from exploitation of resources to permanent settlements on the moon. [3]

The moon has become the focus of economic interests, because it is easy

(25 Article 11) (d) An equitable sharing of the benefits derived from those resources by all States Parties, whereby the interests and needs of the developing countries, as well as the efforts of those countries, which have contributed either directly or indirectly to the exploration of the moon, shall be given special consideration.

44 The 1967 UN Outer Space Treaty stipulates that no government can own extraterrestrial property, but it neglected to mention individuals or corporations.

24 Recognizing that significant changes have occurred in the structure and content of world space activity, as reflected in the increasing number of participants in space activities at all levels and the growing contribution of the private sector to the promotion and implementation of space activities

42 If there will be a law one day that will make space exploitation possible for big companies we will stand in line with (up until now) 50.000 opponents. This will cause enough attention, to bring this draft into public discussion.

3 Some governments will pass legislation stating their intent to recognize and defend the validity of property claims by space faring companies. Such laws will encourage entrepreneurs to pursue space-based endeavours. Only then will the space frontier truly be open.

3 For corporations that must repay their investors, however, property rights are a prime concern. As long as the government treats space in the public interest, no economic incentive to undertake commercial activities in space will exist. Until this issue is resolved, mining operations are not only unlikely; they are probably illegal.

to reach and the maintenance of a moon station could be easily guaranteed. The moon would function as a supplier of raw materials and at the same time as a diving board into outer space. The plans start with the construction of a self-supporting moon station – concepts for oxygen production and water supplies are already prepared – and they progress with profitable exploitation of raw material like the rare gas helium-3 or the utilization of solar energy for power supplies on earth. [12]

12 Establishing an extended human presence on the moon could vastly reduce the costs of further space exploration, making possible ever more ambitious missions.

The Artemis Society International, a society consisting of moon-freaks and entrepreneurs, plans a permanent commercial moon settlement. Detailed information and plans are already drawn. A first settlement, similar to a kind of shelter, is estimated to cost 1.42 billion dollars. These costs can be compared to the construction of a drilling rig in the Atlantic. [46]

46 From this initial base, we will explore the moon to find the best sites for lunar mining operations, and for a permanent lunar community. Along the way, we will begin commercial flights to the moon. At first these will be expedition-class flights for rugged explorers, the sort of trip that will appeal to folks who enjoy safaris, climbing mountains, and exploring hidden caves. Eventually, the lunar tourism industry will grow into luxury-class trips on large space liners.

A station on the moon would bring manpower and thus build up an existing infrastructure on the moon. Immediately, frequent users would give support and profitability that would enable realization of many commercial concepts.

The low gravity on the moon would also be useful as a base to start space missions more easily and with less energy. The major problem with all these projects is finance. Maybe the new American space plans will change this.

Hocus-pocus – there we have the new public space. Political interests and economic development are changing cosmic nature into a civilized space that still carries some dangers and financial obstacles, but is potentially prepared for further exploitation, although critical potential is still missing. [44] A drilling rig in the Atlantic represents a public space that cannot yet be compared to marketable, profitable urban spaces. But the possibility for broad access or a media attracting action for example a Greenpeace intervention could turn it into a space of public interest or even a public space. The increase of user frequency in outer space will follow the progression of space tourism and the connected price reduction for space travel. When humans stepped on the moon the first time, not even the airplane was a democratic travel vehicle. Today flights are sometimes cheaper than travelling by train. We only have to wait a few years and with the usual gesture of imperial land appropriation a piece of outer space will be prepared.

44 For example, imagine if we find oil on the Moon. Should we prohibit its exploitation for the entire human race by law? Surely not.

Problems of the new economic site

Today we have already contributed a serious amount to the pollution of outer space. One big problem is the nuclear pollution through astronautics: In the sixties several explosions in orbit caused high radiation in the earth's atmosphere. The second difficult consequence is space trash that is left in orbit with every explosion and every rocket launch. Around 330 million man-made parts are tracked so far in earth's orbit with a diameter of more than one millimetre. [47]

Even small particles can cause major damage if they collide with rockets or spaceships, they might even destroy them. The floating objects and particles are registered in databases and spaceships try to navigate around them. But still they represent an uncalculated risk for astronautics.

Another problem is of a medical nature: The effects of weightlessness on the body complicate working conditions for astronauts. Under conditions of zero gravity forces disperse differently over our skeleton and muscles. The changed water balance of our body leads to spindly-legs and bloated faces. The consequences of prolonged stays in Zero G are bone reduction and muscular atrophy. Not without reason astronauts emphasize the importance of daily body training. [48]

The body is also exposed to high radiation through sun winds and supernova explosions in the universe. Occasional eruptions on the sun surface "release in less than a day a radiation dosage that is 1000 times higher than the environmental radiation on earth in one year. " [48]

As there is no kilometre thick layer of air in the atmosphere like on earth, today water tanks are stored along the walls of the space station to provide protection from cosmic radiation.

Another problem with labour in outer space is the psychological factor: The isolation in narrow space means psychological stress for all participants. Isolation experiments on earth, for example at the Freie Universität Berlin in a reconstructed complex of the ISS, try to analyze psychological stress during long-term space flights. [49]

47 Because of the high relative speed of even the smallest objects they are highly dangerous for manned and unmanned astronautics. A piece of space trash hitting a satellite could affect its function and respectively lead to a total mission failure. Therefore space trash becomes an economic risk for satellite operations.

48 Do your exercises and everything is fine; if you don't do them we will carry you out of the space ship. (Inessa Kozlovskaya from the Institute of Biomedicine Moscow)

49 The scientists are largely shielded from environmental stimulants. They have to live together in confined space, get along with each other and solve conflicts. Escape is not possible. The daily structure is – worse than in the army – strictly controlled and exactly monitored

Art in public outer space

The arts and outer space

The difficult working conditions also influence artistic practice in the universe. How can you produce art in free fall? Until now there have been barely any experiences of how art can be produced under weightless conditions. For a better idea of what the conditions would be like we rely on the comments and descriptions from space travellers that have experienced outer space. [50]

Could art "improve" the monotony and social life on the space station? Does art stay a decorative appendage or could serious artistic experiments be realized? What role does art play in relation to the political and commercial appropriation of outer space and where are the starting points for a critical analysis?

Starting research about space art on the web, I first found a big number of "visionary paintings": Realistic descriptions of space scenarios and planetary landscapes the sort of well marketable utopias for living rooms or offices, done in airbrush, oil or computer-generated. Also a glance at the NASA website shows their art collection presented in the Copernica Art Data Base. The web design is well done, but the contents resemble insignificant products for space enthusiasts and have nothing in common with a critical approach. [51]

The established art industry of institutions, alternative and public spaces on earth show art that deals with outer space mostly in a philosophical and fictional context. There are two main fields: art that is influenced by scientific knowledge and utopian visions of the future illustrated by artists. The critical approach towards outer space happens in different

50 Imagine you jump out of an airplane and until your parachute opens you have to try to live your normal life; do your work; take a rest etc. That's exactly what weightlessness is. (Sergei Krikalev)

51 Like much of science fiction literature, space art is rarely considered to be "serious" art but rather anecdotal to mainstream contemporary art. Consequently, space art is most often found in technical museums and planetariums.

new medias. Some art objects even found their way into the universe. Only a few viewpoints conceive outer space as real public space.

The following paragraphs will discuss art works that I consider important and groundbreaking on the path to art in public outer space. My focus begins in the twentieth century, when the real possibilities for astronautics have been set. The imagination and mythology of outer space goes back centuries, the sensation in dreams of flying and levitation, the omnipresence of cosmic nature, the sky as allegory for infinity and as a mystical location – all these topics are historically part of artistic inspiration. But they stay sublime and religious speculation until the technological preconditions become available. In addition "praising the moon" seems to loose relevance facing the changed role of the artist in society, and the possibility of border-crossings between art and science.

I want to avoid digressing into a discussion of the connection between science and fiction, the exchange of ideas between technical development and visionary models that have their climax in science-fiction. Today, visual artists no longer produce the popular visions of space; this field has been taken over by the Hollywood film industry. I also will neglect art that reacts to film and media science-fiction imagery. I will begin with the development of two and three-dimensional museum space at the beginning of the twentieth century, continue with art in aerospace and lead to the exploration of real possibilities and potentials for art in outer space.

In the following I will transform a system that Peter Weibel constructed for the definition of art and telecommunications and apply it to art in space:

He divides: [106]
1. Art historical positions that use the new technologies as a field of study:
a) art works or –styles that develop specific aesthetic strategies as a reaction to the new technological world, for example Malewitsch, Fontana etc. and
b) art works that copy new technologies in their historical art medium without changing or questioning it, for example planetary landscapes in a realistic oil painting.
2. Art that takes the new technologies of astronautics and outer space as a new artistic production space, carrier medium, form of expression, creative possibility and communications medium.

1b references scientific illustrations, science fiction, space fantasy and astronomical art. [107] These art styles have no further importance for the discussion of outer space as a public space, except their function as marketing tools for the myth and the popularity of outer space. Artists in the field 1a renew the historical art forms as a reaction to technical and scientific innovations. They continue to work in their old art medium and only approach, in small ways, any real utilization (point 2) of outer space. [52]

52 At the beginning of the twentieth century a new notion of space was imagined, earthly-limited thoughts were defined as antiquated. The earth could not become the best of all worlds; the new seems to be a cosmic dimension in outer space.

From canvas to aerospace

Malewitsch reacts with his form of suprematist painting on utopias of weightlessness. He wants to expand his images in the forth dimension. Top and bottom of the canvas doesn't exist any more. His thoughts result in the so-called "Planits", architectural constructions for terrestrials in the universe. [53]

53 Every constructed suprematist body will be integrated in a natural organization and form a new satellite: Everything it needs is the interrelation between two objects floating in space. The earth and the moon; in between them the new suprematist satellite can be constructed, equipped with every component moving along an orbital path and forming a new track.

Wladimir Tatlin connects his "Monument of the III. International" from 1919 to the rotation of the earth and the inclination of the earth axis. The technical enthusiasm of the Russian avant-garde also finds a mirror in the work of Laszlo Moholy-Nagy who, in his camouflage-project in Chicago, experiments with weightlessness and thinks about strategies to mask earth and urban landscape from the air. [54]

54 In his seminal book "Vision in Motion", published posthumously in 1947, Moholy-Nagy appears levitating a chisel with compressed air.

At the same time Buckminster Fuller works with models of a four dimensional world and a changed view of earth as a network of communication and traffic patterns. [55]

55 The "global consciousness" leads him to propose solutions for the problems of world population. Starting from the idea of a four-dimensional world, he develops since the late twenties concepts that deal generally with supply, transport and housing problems.

With the media's growing focus on astronautics in the sixties, the universe becomes a topic for artists. In his manifest of spazialismo, Lucio Fontana propagates the detachment of humankind from earth. But his engagement still happens earthbound on the canva. [56]

56 With space we mean first of all those spaces, that are supposed to be mysterious and are now known and explored and thus treated as a material by us. (Fontana)

Since 1959, Piero Manzoni has been painting kilometre long "lines" on paper that are finished when the length of the earth's periphery is reached. In 1961 he builds a pedestal for earth that he puts head over heals on the ground (Base del Mondo, 1961). The antithesis to this work could be Bruce Nauman's neon sign " My Name as Though it were Written on the Surface of the Moon" from 1968. Every letter is written six times for a

57 Human beings are only able to conquer space with the forces of imagination. Neither missiles, nor rockets, nor sputniks make man a conqueror of outer space. (Yves Klein, New York 1960)

58 This airport is only a small spot in the infinity of the universe, a hardly perceptible point in the immense cosmic vastness, a dust particle in an impenetrable nowhere – the aerial art reflects to a certain degree this immeasurable vastness.

58 For some people the infinity of the planetarium is a frozen whirl at the end of the world, an immense structure out of concentric circles framed by an endless collection of ideas as objects, a collection of model universes. Here is also the domain of the Great Bear.

59 Airspace is the only one that gives man almost unlimited freedom. (Why don't we make art for aerospace, no exhibitions in the sky?)

59 Until now, we have left it up to war to create a naïve light ballet for the night sky, to illuminate the sky with colour signs and artificially or provoked conflagration.

higher legibility. In gallery Iris Clert in Paris, Greek kinetic artist Takis starts an experiment about the impossibility of a human in space ("l'Impossible, Un Homme Dans L'Espace", 1960): He films Sinclair Belles, who wears a "space suit" designed by Takis and is catapulted through a room towards a security net. At the same time he is painting "Planetary reliefs" (1961) – of course in his special "Yves Klein blue" – and gets a photo of himself taken while jumping weightlessly out of his window ("Saut dans le Vide", 1960).

Suspended paintings and sculptures floating in midair as well as conceptual art works reflect the new worldview and astronautics. But outer space still remains a product of artistic imagination. [57]

The real utilization of aerospace and the optical transformation of earth's surface are first attained by sky and land art. Artists like Walter de Maria, Robert Smithson and Christo leave the white cube and work with landscape as a material. "Spiral Jetty" by Robert Smithson is best observed from an aerial view. He puts together a concept for an Aerial Museum in the air corridor of an airport. There, art projects should be presented for the passengers of departing and arriving airplanes. [58]

Under the title "The Domain of the Great Bear" he plans together with Mel Bochner a presentation script for the projections of the Hayden Planetarium in the Museum of Natural History. [58] The artistically motivated script with stage directions for the projectionist crosses the boarder into the scientific domain of astronomy and its mediation.

At the same time Otto Piene, member of the artist group ZERO, starts to be interested in aerial space. Starting with lighting arrangements for interior and exterior spaces, he transforms his works to illuminated kinetic air constructions that are presented as sky art open-air events in America and Germany. [59]

One highlight is the "Manned Helium Sculpture" from 1969, which might be considered a reaction to the manned flight to the moon. For this event a 17-year-old girl is lifted into the air with helium balloons and stays there for the whole performance in this weightless condition. This is Piene's reply to the military race with lightness and beauty. [59]

These concepts can be considered the first real approach to the potential of space art, although they happen in aerial space or should be seen from there.

Piene is still active politically and as an artist. The "Sky and Space Artists' Manifesto" from 1986 is proclaimed at the "Unispace Conference on the Exploration and Peaceful Uses of Outer Space" at UNESCO in Paris. Together with Elizabeth Goldring and Lowry Burgess he demands more attention, mediation and teamwork between space faring governments and artists. They want to reach a concrete possibility for free artistic use of satellite systems. [60]

Art works using satellite technology are known since the seventies. "Two Way-Demo" from 1977 is the first artistic collaboration between (among others) Willoughby Sharp, Liza Bear and Keith Sonnier for a transcontinental two-way-satellite-conference. The visual advance into space is realized in 1977 by Charles and Ray Eames with the legendary video "Powers of Ten". The camera starts at a picnic in a Chicago park shown from aerial view and zooms into outer space. The camera zoom is returned and on its way back it immerses into the microcosmic structure of a man's hand. [61]

Outer space in the contemporary museum

From the eighties until now outer space, astronautics and technologies that are connected to space, are repeatedly referenced in many art works. Tom Shannon's abstract magnetic sculptures that suspend one object over another or James Turrel's weightless light rooms are only two examples from a range of artistic practice. A lot of projects reference and are inspired by science fiction above all films like 2001–Space Odyssey and architectural visions from the seventies like Archigram. As outer space became a popular quote of pop culture a lot of contemporary museums were invaded by rocket-like sculptures (Silvie Fleury), space ship interiors and extraterrestrial cyborgs (Mariko Mori). Mariko Mori's "Wave UFO" interacts as a multimedia spaceship with the spectator and resembles a futuristic space station. Exhibitions like "Zero Gravity" (2001) at Kunstverein Düsseldorf try to analyse the phenomenon of weightlessness. With the exception of Hans-Peter Feldmann, who analyses the representation of weightlessness pictures in the media, the museum space remains very

60 Sky artists enthusiastically seek productive alliances with all space agencies. We are asking for the establishment of national and international councils that will advocate specific artistic projects to the appropriate institutions and agencies. Additionally, these councils will assist with the implementation of far reaching artistic endeavors that will embody subtle and humane purposes.

61 Powers of Ten illustrates the universe as an arena of both continuity and change, of everyday picnics and cosmic mystery. The film also demonstrates the Eameses' ability to make science both fascinating and accessible.

terrestrial. The white cube, has up until now, only reproduced dream visions of outer space.

62 Unfortunately there were serious miscalculations made about the rockets ballistics and engines. Tow seconds after ignition, the rocket fell back to earth after having lifted of the ground for just one centimeter.

A range of artistic projects approach outer space with a strategy of conscious failure. These works leave the ideal level and deal with the terrestrial limitations. Roman Signer experiments with rockets and points with smoke and noise towards the difficulty of overcoming gravity. The action "Explosion, Box with Hat" from 1995 leaves only a blown up box and a hat hanging above it. The artist, who was the connector between the two objects, was thrown back to the "real ground" and is at the same time the indicator of the height of fall. In the video "The staircase" Peter Land tumbles down a never-ending staircase in permanent repetition. The projection on the opposite wall shows a starry sky. The infinity of the universe is confronted with the falling man, who is exposed helplessly to earth's gravity. The artist group Gelatin is going on a "Mission to Venus" in their self-built rocket "True Love IV". The lift-off is staged, accompanied by a brass band, and ends with the explosion of the rocket. The four astronauts in the name of love "survive" the failed space conquest. [62]

63 My first installation inside the shuttle. I installed a glittery disco ball that makes a little more atmosphere on board. It immediately reminded me hot dance nights at my favorite club. I put in my Dionne Warwick cd and danced singing through the space shuttle. Dancing isn't so easy in weightlessness and my colleagues - mostly scientists - couldn't work with me making so much noise. They called me an eccentric artist...

Also my project "Space is the place Vol. 1" from 2001 plays with the impossibility of overcoming gravity. In a space suit made from inflated balloons I try to simulate the condition of weightlessness on the body. The result is optically believable, but without the reality value of an experience based on facts. The following work, Vol. 2 from 2003, simulates a two-week-stay in space on board a spaceship. The interactive space diary describes my mission as the first artist in space analyzing the working conditions for art production in zero gravity. It contains a report on my discussions with the scientists on board – who consider design more useful than art in space – and describes the daily difficulties of life in space ranging from loneliness to discomfort. [63]

Aleksandra Mir, in 1999, uses the terrestrial public space of a beach at the Dutch coast for her re-enactment of the moon landing in "First woman on the Moon". With excavators and heavy machines the sand beach is transformed to a crater landscape, in which the artist staged her performance, which culminates in hoisting the American flag. Mir references the "moon hoax", a conspiracy theory that is mainly discussed online and that tries to unmask the Apollo landings as a film production. This discussion can be followed, among others, on Phil Plait's Bad Astronomy Homepage. He tries to defeat all criticisms that unmask the moon landing as a hoax, like

the strange studio-like shadows or the impossibility of a flattering flag in the moon vacuum. [65]

The American artist group "Little Big Bang" works with a self-created hoax. Dressed as astronauts they give guided tours in the Aerospace Museum in Washington and pretend to be part of the official program of the museum. They talk about their experiences as artists in space, experiments to colour the moon in blue, the orange cheese powder they brought back with a moon rock and that is used now for macaroni and cheese, and the rejuvenating anti-radiation technology they developed for spacesuits that is used now for anti-aging cosmetics. At some point the visitors realize that they are part of an art project. The group starts with believable facts about astronautics and gets more and more fantastic until in the best case the museum security discovers their disguise. [66]

The video installation "Star City and Proton, Unity, Energy, Blizzard" from Jane and Louise Wilson is filmed in the Russian cosmonaut trainings centre. The artists try to analyse the connection between political structures and astronautics by showing the decline and lost glory of this Cold War relic. The technical machine aesthetics references and replaces the power apparatus. The absence of actors emphasizes the irrelevant position of human beings in these systems. The two sisters even got permission to shoot footage in places of the Russian space agency that are closed to the public. [64]

Critical virtual approaches

A media network of the nineties, the Association of Autonomous Astronauts, explores the power structures of outer space. The self-appointed chaos engineers try to open up access to space for everybody as "community based space exploration". An international non-hierarchical network with groups in Britain, the US, Australia, Austria, the Netherlands and other countries organize several conferences throughout the world within the scope of a five-year plan. They play three-sided soccer, organize "raves in space", make activist interventions like the symbolic occupation of the Lockheed Corporation in space suits, and build together with children (in Vienna) life-sized rocket models. The theoretical discussion ranges from the question of the existence and possibility of "Sex in space" [112] to "Who owns outer space". [68] The AAA participate in demonstrations

65 Bad: When the astronauts are assembling the American flag, the flag waves. Kaysing says this must have been from an errant breeze on the set. A flag wouldn't wave in a vacuum.
Good: ... In a vacuum or not, when you whip around the vertical pole, the flag will "wave", since it is attached at the top. The top will move first, then the cloth will follow along in a wave that moves down. It isn't air that is moving the flag; it's the cloth itself.

64 These sites, once beacons of Soviet power, are now in such a state of decline, that it is sometimes difficult to tell which facilities are still in use and which are abandoned

like the “Carnival against Capital” (1999) and as space activists demand that we “Reclaim the Stars”. Their situationist mission is the “establishment of a planetary network to stop the monopoly of big companies, governments and the military in space travel”. [104] The tool of the “collective phantom” is the information war via Internet, radio or other media. [67,68]

The parallels between the two public spaces, the Internet and outer space, can be confusing, because some of the virtual projects in the deepness of the World Wide Web can be misunderstood as real concepts for public outer space. It is getting even more complex to differentiate as some projects are based on virtually existing commercial structures like the moon property. A number of art projects depend on the possibility of these land purchases and they approach the concept of land appropriation in a critical way.

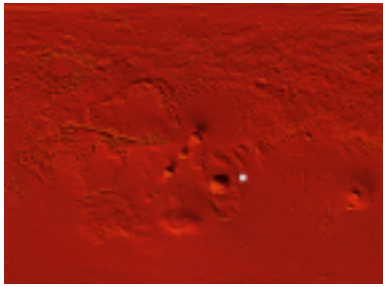
The Mars Patent, a project by Claudia Reiche and Helene von Oldenburg demands an expansion of the established arts industry to Mars. On their website they offer the possibility to hand in art projects for the MES, the Mars Exhibition Site, north of the Mars equator in the so-called Elysium Planitia. [69] A High Reality Machine HRM_1.0 transforms the sent ideas into real objects on the surface of Mars that can be observed via live webcam if there is no technical disturbances. Proposals can only be sent by female applicants according to the application instructions, with the objective to open up an alternative on Mars to the still male-dominated art system on earth. The presentation of the Mars projects happens on the web and in terrestrial exhibition spaces. Where, and if, the art objects on Mars remain and how they are actually realized by the HRM is not very clear from our terrestrial viewpoint. The process of “feeding physical spaces into the web is an attempt of re-territorializing” similar to the “extraordinary real pizza service on the web”. [70]

In the scope of a land acquisition project, Cabinet Magazine also buys property on Mars in the Eastern Amazonis Planitia. Their plans for the 3.125 Selims (1 Selim = 1 square mile) are also the realization of art projects and a little house made of glass from which they can look back to earth. The group of artists and theorists publish a topical magazine that contains essays and interviews and added art projects for or in the magazine. For the issue about “property” they purchased, parallel to the land on Mars a piece of desert in Luna County, New Mexico which is divided in small

67 The Association of Autonomous Astronauts describe themselves both as 'the most exciting space exploration program' and 'the most important (r)evolutionary group' active in the world today. What is most striking about their media invasion campaign is their ability to adapt their propaganda for each specific context, whilst still managing to communicate the important ideas about themselves; ...that space exploration technology will get cheaper and more widely available and a struggle exists over how this technology is used and who gets access to that technology; that space exploration opens up the possibility for creating autonomous communities in outer space that do not replicate life on earth.

68 The AAA doesn't need a business plan to get off the planet - the most powerful rocket fuel we have is the power of imagination. Smash the hotels! Squat the moon!

69 THE MARS PATENT is a place for art and theory and is sensible (in) regarding its various concepts. THE MARS PATENT will exhibit projects, considering the special situation of the Mars Exhibition Site, e.g. geographic, geologic and meteorological aspects. THE MARS PATENT offers a suitable position for sculptures, internet relay chats, kinematical objects, art- and media theories, science fiction literature, videos, sound installations, manifestos, web-art etc. (You could even try it with paintings, but please send digitised formats. Remember: There are no walls on Mars!)

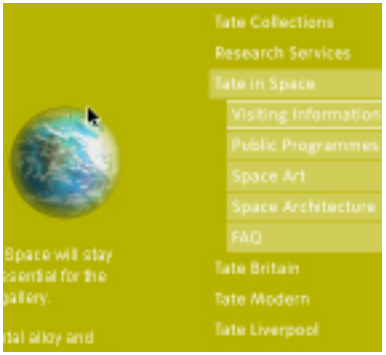


magazine-sized areas and rented to their readers for 1 cent. They also try to repurchase 13 urban voids in New York, small pieces between real estate, that rely on Gordon Matta Clark's work "Reality Properties: Fake Estates". These pieces of land are then also used for art interventions. As the Mars project cannot be realised yet it is replaced by an interview with land seller Dennis Hope that should clarify the utilization possibilities of the purchased land on Mars. [71]

71 If the creature you have made contact with is incapable of expression in a form of communication understandable by humans that this is their land, then you will have shared ownership with the native creature. If, however, you run into sentient beings that express to you that this is their property, then you must obey that request.

According to Hope there are no architectural restrictions. But material has to be used that can be found on the planet already. The property rights are clarified in the Martian Constitution Bill of Rights, another Hope product. Also the "right" behaviour when facing extraterrestrial populations is described.

The homepage of the British Tate Gallery has an astonishing link to a Tate in Space Program, which explores the possibilities for art in outer space with a Tate satellite that is obviously circling above our heads. The website discusses the question of a possible de-contextualization of site-specific works on earth when shown in outer space and the problems of conservation of artworks in space. The changed exhibition conditions in a weightless environment demand new models of the white cube, of the exhibition architecture and hanging and presentation of art works. The Tate in Space also wants to engage in the changing function of art in space and the possibility of art audiences. [72]



72 Tate in Space is attempting to redress this as an intrinsic part of its future program, exploring the potential for artist's residencies, sci-art collaborations and new commissions in addition to developing imaginative and appropriate ways in which Tate in Space may accommodate existing works from Tate's collection.

Reading between the lines one can find that the Tate in Space is a site-specific project for the Tate website. Artist Susan Collins calls her critical approach to the potentials of art in space "part fact, part fiction". [73] The website is programmed as an interactive platform and the user can contribute his own visions about space in "a work of constantly expanding collective fiction". [73]

73 It is intended as an agent provocateur; a catalyst, structure, space for people to occupy that also invites debate and reflection on the nature of art in space, cultural ambition, and an examination of the role of the institution and the individuals within it.

Collins commissions ETALAB, Softroom and Sarah Wigglesworth for artistic drafts of a space museum and calls for entries for a competition among architecture students. An online discussion forum and a historical review of space art make the website an interactive information platform.

Real beginnings of an art practice in outer space

Art sent into space – The extraterrestrial plop

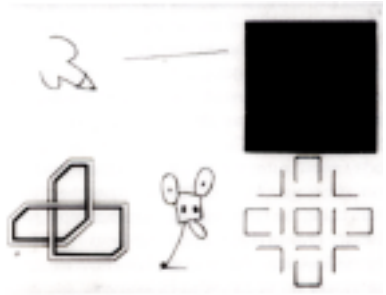
Besides the spiritual and virtual concepts that deal with outer space, numerous projects are already developed or de facto realized that involve outer space as an actual site. The history of space art has been written parallel to the established art market and covers projects with real space feeling. Roger F. Malina, the publisher of "Leonardo: The Journal of Art, Science and Technology" has been cataloguing space art for some time and defines different categories according to their orientation in relation to the earth or the universe. I will reference his sub-categories in the following. [85]

74 If they have eyes in their head they will love it. (Hirst about his imagined extraterrestrial art audience)

Not to delude anybody – there are only few art works that made their way into space; the majority of the artistic concepts remain drafts. The works that are sent into space with several space missions, as messengers of humankind or as cultural material for possible extraterrestrials, are not critical approaches at all but representational miniature objects.

Mankind recently has lost one of these works together with the failed Beagle-2 mission: The credit-card-sized dot painting of British artist Damien Hirst; maybe it is sold already at an extraterrestrial auction? [74]

The painting is done with space-proof pigments and is constructed as a calibration tool that should indicate the scientists in the control centre the right function of the board instruments. The song "No distance left to run" by the British rock band Blur, that should answer the Mars Odyssey as a radio signal, has not sounded in the universe. Obviously there is more distance left than imagined – the Beagle-2 stays lost. Also on board was the glass globe FRED to test Ferrari red in outer space. Art and commerce go hand in hand as equally representative of terrestrial culture.



Art transported to outer space has predecessors. Already, in 1969 the moon museum is brought to the moon on board the Apollo 12. The small badge contains contributions from the American artists Andy Warhol (drawing of a penis), Robert Rauschenberg (drawing of a line), Claes Oldenburg (drawing of a Mickey Mouse image) and John Chamberlain,

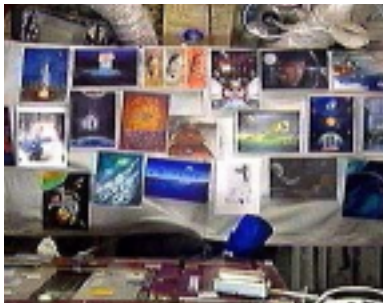
Forrest Myers and David Novros (geometrical designs). That means there is a real existing museum on the moon exclusively for male artists without administration, curators or an audience.

The drawings in the moon museum were joined in 1971 by a small sculpture left with other private belongings of an Apollo 15 astronaut in the moon sand. The small statue almost resembles an artistic intervention and will occupy plenty of future moon travellers and pathfinders.

In conservatory experiments like the "Vertical Horizons" project, art works are tested in special G.A.S. canisters of NASA for their "durability" on space flights. A conceptual work by Lowry Burgess is realized in 1989 as a "non-scientific payload". [85] "Boundless Cubic Lunar Aperture" consists of holograms, cubes with scientific elements and water samples from all the rivers of the earth.

Richard Kriesche realizes a participatory project for the Austro Mir mission. The interactive video ARTSAT involves the cosmonauts on board the Mir who answer live to transmitted signals. The work of Jean-Marc Philippe involves larger groups of people. In 1987 he collects messages over minitel and sends them with a radio telescope into the universe. At the moment he is working on KEO, a similar project that uses the Internet. The collective database for individual messages will be sent into space in 2006 by satellite. 50,000 years later it will be brought back to earth to be read by a future recipient.

Mir-Cosmonaut Alexej Leonov draws in outer space and is exploring consciously or unconsciously the working conditions for art in space. He also takes paintings made by his friend, the Russian artist Andrej Sokolov, on board the Mir together with works of other Russian painters. The space station has also been, since 1993 until its demolition, the site of the first sculpture in space: The "Cosmic Dancer", created by Arthur Woods, floats around as an abstract object for the pleasure of the cosmonauts. In 1995 "Ars Ad Astra" is the first group show in orbit: Organised by Woods and Marco C. Bernasconi from the OURS Foundation. Twenty originals and eighty-one digital works are presented during the EUROMIR'95 mission. [75] The small format paintings are shown in "Petersburger Hängung" (Petersburg style hanging), a sort of hanging paintings wall filling from floor to ceiling. To remind us of the notion of the white cube they use a cover or awning as a white background.



75 The theme of the exhibition was "Space and Humanity". The artists were challenged to make "space qualified" artworks that were lightweight and used non-toxic materials. Each artwork was carried out on paper that measured 21 x 30 cm.

The majority of art works sent into space resemble typical art for interior spaces like terrestrial living rooms, office spaces and bank branches. The experiments happen in man-made closed structures as art for space habitats. Space is explored for its museum potential. The classic art repertoire is used from painting and sculpture to conceptual works. In relation to their audience the works are over-represented. The model of the white cube is transferred as it were onto a space station under the condition of weightlessness. Ignoring the fact that its formal scale and standards and the arrangement horizontal / vertical or top / bottom are connected to gravity on earth.

The artistic efforts mirror the same parallel strategy. Individual studio practice with decorative emphasis is predominant. Critical approaches are lacking, only typical provocative elements can be found like Warhol's penis drawing. Instead art in space is loaded with all the representation of terrestrial western culture.

It is not the actual art object that is relevant, moreover its position in space. Despite the importance of the location none of the projects are site-specific.

What about concepts that continue the tradition of the land or space art, that consciously left the museums in the seventies as a statement of institutional critique and reacted to self-selected places in public space?

Art on earth seen from space – Expanded land art

Malina's space art collection mentions only two projects that are big enough to be seen from the perspective of outer space. American artist Tom van Sant uses huge mirrors, which are organised as abstract forms in the landscape and create reflections on the earth surface. "Desert Sun" from 1986 is reminiscent of similar works by Smithson; still their dimension is considerably bigger. Pierre Comte creates 1989 "Signature Terre" with large black plastic cover as squares in the landscape. Both works are documented and photographed via satellite.

Works of land art can only be seen from aerial space. To be seen from outer space the dimensions of these projects have to be huge. Technically no problem exists for the realisation of this kind of work. But the ecologi-

cal effects need to be considered. Seen from a terrestrial viewpoint these works that cover enormous areas must resemble an immense material battle against nature. If tourist space flights develop in the expected way these works could become attractive reference points for the view back on earth. Certainly a danger could be that they are adapted as representational advertising spaces.

Art in space viewed from earth – Expanded sky art

Problems of similar dimensions can be expected for art in space viewed from earth, so-called orbital sculptures. Their scale also has to be "blown up" in relation to their distance from earth. The transportation into orbit is expensive in both technical and financial respects. Thus they become costly experiments that can be realized only in collaboration with space agencies and massive sponsorship. All concepts of this category of space art remain in planning stage until today.

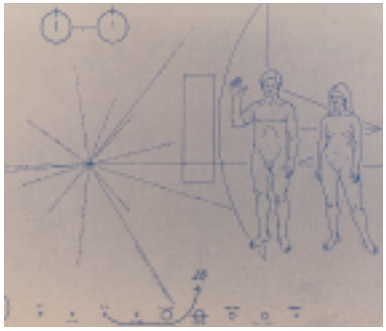
The projects that have been planned but unrealized so far are mostly inflatable sculptures with reflective surfaces similar to the technology of the Echo 1 and 2 satellites that have appeared in the sixties as extremely bright reflecting light-points in the night sky. These drafts range from Pierre Comte's solar-sail sculpture that can be seen as a small star from earth, to moon-sized rings in the night-sky. Arthur Woods' "Orbiting Unification Ring Satellite" from 1986 is a quarter-moon-sized inflatable sculpture with a diameter of one kilometre and a weight of 19,7 tons that reflects sunlight. In the same year Group Spirale planned a ring sculpture that was even bigger: consisting of 100 reflecting balloons and 24 km in diameter it would be bigger than the moon. In 1988 James Pridgeon wanted to create two artificial stars out of 30m big Mylar balloons that should symbolize East and West in the night sky.

Apart from these artificial star constructions there are propositions like Joe Davis artificial aurora from 1982. Scientist Gerhard Haerendel describes a further possibility for light sculptures in the night sky. In different experiments with weather balloons, rockets and satellites barium vapour is released in orbit. The chemical reaction is intensified through the sun winds and makes space plasma visible so that it can be studied optically. The emerging forms look like artificial comets or UFOs. [77]

The Palm bringt Dubai auf die Weltkarte

The World bringt die Weltkarte nach Dubai

77 The motion of the normally invisible space plasma can be made accessible through the optical observation of barium clouds and the forces happening between both plasmas can be analysed.



76 The artist has to realise his social possibilities, his social responsibilities, he has to put flowers in the sky, he has to make the image of pure art visible, furthermore, has to communicate with more and more people, to leave the ivory tower, to be heard, he has to make his artistic message visible for everybody!

The problems of visual projects in orbit would not only be the disturbing reactions of non-scientific observers on earth that watch these experiments. We don't need much creativity to imagine what would happen on earth if moon-sized ring sculptures illuminate the night sky. Well, we could get used to it after a while, but still it hits to the core of the problem: Space art seen from earth looks like a space invasion from the universe. Art is used as representative of predominant global politics. At the same time art projects in earth's orbit could have the potential to point critically to the military and commercial occupation of outer space. This hybrid function of art that, on earth, led to the debate about "undesired monuments" [10] in public spaces, becomes increasingly problematic in outer space.

The whole world's population becomes voluntary or involuntary art spectators. Participation of the audience in the artistic decision making process comparable to participatory projects on earth seems to be impossible because of the logistics of organizing the task. The common artistic sense would have to be reduced to the common denominator of all cultural contexts of the world. At the moment most artistic concepts are conceived from a western cultural model. With their presence in the sky, these works would be read as imperial gestures of space faring nations. Artists still confront the political endeavours of power in space with human greatness and refer to the model of the "beautiful, true and good". I doubt that flower-power spirit projected on the universe would be a sufficient answer to military commercial occupation. [76] In addition, art objects floating in the universe would add to the problem of space pollution and could cause accidents.

Art in space viewed from space – Orbital art spaces

A sub-category to these projects is art in space viewed from space. These works have smaller dimensions, because they are viewed with less distance. Richard Clar proposes a floating "Space flight Dolphin" in 1982, a two-meter long light sculpture. Projects like this could be imagined in the near future if space tourism progresses as expected. These art works, connected to the exterior of space stations, could function as decorative additions to the amusement program. Besides such projects could also be used for critical artistic interventions.

One of the first attempts could be the project "Collision" from 1995. Clar wants to arrange orbital space trash into sculptures within earth's orbit. He produced a simulation video together with the U.S. Naval Research Laboratory. The forms on the draft are based on the digital data from this archive that catalogues orbital trash.

The Leonardo / Olats Space Arts Databank also mentions the space art categories "art created in space" and "art designed for other celestial destinations". There is no artistic experience in these fields yet except the drawings of the Russian cosmonaut Leonov and the messages of mankind, which were sent into space on records or via radio signal.

Art in Zero G – The new working conditions

A field of space art that is already in an intensive testing phase is art in Zero G. To experience and understand the condition of weightlessness artists participate in parabola flights organised by ESA, NASA or the Russian Gagarin Space Centre and integrate them as part of their artistic practice.

Since 1995, Charles Wilp has been using the condition of weightlessness as the driving force of his creativity and thus propagates a new type of artist: the physically fit enfant terrible in outer space in contrary to the artist as alcoholic which lives fast and dies young. The self-appointed Artonaut works with the "immaterial material of a new space age", he accompanies scientific experiments and he wants to "let new ideas blossom" with his artistic impetus. [78]

78 I got rid of the future. The future and the visions are happening now. (Charles Wilp)

Artist Frank Pietronigro tries to paint on parabola flights in Zero G. He releases painting from the canvas and composes his paintings in space interacting with his own body. For these "drift paintings" he builds a transparent closed cube, in which he can float together with the drops of paint. [79]

79 My intention was simple: to eliminate the structural support—the canvas—while creating paintings floating in mid-air, with my body enveloped in the composition. I intended for technology and microgravity to contribute to the organic development of these kinetic "drift paintings," with spontaneity and serendipity orchestrating the results

The micro-gravity of parabola flights is especially important for projects that involve the body. For contemporary dance and theatre this opens up a new field of research. Kitsou Dubois has worked with choreography in weightless environments since 1993. During several Zero G flights with the ESA and the Gagarin Space Centre she explores a range of movements

and body control with different dancers. [80]

The Slovenian performance group Kosmokinetic Kabinett Noordung uses parabola flights as their stage and theatre space. This group directed by Dragan Zivadinov is part of the collective "New Slovenian Art" (NSK) and has started a theatrical 50-year-plan in 1995 that will end in 2045. The concept of this "total theatre" references models of the thirties and is part of the radical self-collectivisation of NSK. The action is developed and progresses with the death of each actor. They are replaced as abolished parts of the collective body through robotic symbols on stage. At the last presentation of the play in 2045 all actors except the director will be dead in the "optimal" case. The last repetition is staged as a machine theatre in the condition of collective weightlessness in an orbital observatory. The parabola flights at Yuri Gagarin Space Centre are training and event at the same time. The audience for the performance of "Noordung Zero Gravity Biomechanical" has to be on board the Zero G flight to watch the action. [81]

80 It is no longer a matter of deliverance from gravity, but to produce attention despite weightlessness. It is not a question of avoiding the fall but creating a break, a stagnation, not to prevent pushing somebody but to hold and not be pushed away.

81 At the time of the last performance in the year 2045 – that's the plan – all actors will be dead, only the director is alive and the stage full of symbols, rhythms and sounds – an ideal Gesamtkunstwerk, in which the organizer is organizing his material. … The utopian project of a "total theatre" of the avant-garde at the beginning 1930s is brought to a claustrophobic, totalitarian end – for the participants as well as for the audience.

Institutionalization, positioning and résumé

Space Art Institutions – Administrating space art

As so much artistic attention is given to outer space, art institutions should not be left out. Groups like Ars Astronautica and the Leonardo Space Art Working Group [82] are researching current space art projects and trying to support exchange between scientists, engineers and artists. A further source of information is the Space Art Database, as a research tool for curators, artists and scientists. [82]

The aim of British group "The Arts Catalyst" is to mediate between art and science. They organise parabola flights for artists among them Kitsou Dubois and try to make collaborations between artists and scientists possible. [83]

Together with Leonardo / Olats (France / USA), V2 (the Netherlands) and the project Atol (Slovenia) they founded the initiative MIR and tried to push artists into interdisciplinary long-term projects connected to international space agencies. International space arts meetings are organized to reach a broader audience and stimulate support for artistic ambitions in outer space.

The role of these institutions in the development of space art is not yet clarified. They could become important mediators for a critical art practice in outer space. But they could also be catalysts for commercial ventures.

Function of Space Art – Decorating science

The role of space art is not clearly defined. The term 'space art' is misunderstood often as euphoric future visions that resemble artistic strategies for a further conquest of space. Most artists also want to occupy the universe in the name of mankind. The OURS Foundation defines the new art style as "spaceoptionism", "spaceoptimism", "spaceism". [84]
The keywords of politics and economy are adapted uncritically for art: Space as an option and positive appropriation.

82 The Leonardo Space Art Working Group is a group of individuals who are working together to investigate and promote the cultural dimensions of space activities.

83 The Arts Catalyst's mission is to extend, promote and activate a fundamental shift in the dialogue between art and science and its perception by the public. We organize and promote exchange and collaborations between artists and scientists, and new research in multidisciplinary laboratory situations.

84 Artists and architects of the new millennium, burdened with the pessimistic baggage that has become the legacy of post modernity, yet aware and convinced that human destiny on Earth is irrevocably linked to human destiny in Space, have the unique opportunity to passionately imagine and build a truly optimistic and inspiring future for humanity - one that is far more compelling than any virtual reality imagined so far.

William K. Hartmann finds four functions of Space Art:

"1. Encouraging scientific exploration
2. Recording historical evolution planetary exploration
3. Promoting international cooperation
4. Synthesizing information to stimulate new ideas about the universe and our relationship to it." [86]

Ongoing commercialization could find new functions for space art in the field of promotion and marketing. Tobacco Company West already undertook the first steps in this direction in 1992. They commissioned German artist Andora to paint the outside wall of a Russian proton rocket with art and advertisements.

The function of art consists above all as a commercial and political instrument. The critical artistic approach is left outside unable to get access to the highly secured technology of astronautics. The artists remain decorative workmen and not equal partners similar to their status at the beginning of artistic practice in public space on earth.

Art represents the "human element", in a business were all political and economic aims are targeted towards power and capital and not human beings. [85] Art serves above all decorative and representational functions. It seems as if the conflict around the position of art in society is projected into outer space and emphasized. There is no need for art in the universe, not even astronauts desire artistic interventions for diversion. [87] They are satisfied enjoying the marvellous prospect of the blue planet and cosmic nature.

85 The creation of contemporary art is inextricably tied to the process of creating human civili(z)ation. Within this perspective, art making will occur as a part of space exploration, and in fact art making must be encouraged in space as one of the ways without which, in the long run, human use of space will be incomplete and unsuccessful. (Roger F. Malina)

87 We don't need much entertainment. Even after months the view is sufficient I would say. The view is fantastic, the blue earth, but also the starry sky without the disturbance of the atmosphere.

Design versus art – Continued conflicts

The integration of design and architecture into space programs is less difficult. These two fields have, besides their decorative function, a direct applied utility. Several international calls for entries by ESA and NASA for architects and architecture students show the interest of space agencies in functional improvements to working and living conditions in outer space. The chair for building studies and product development at TU (Technical University) Munich is working in cooperation with the faculty of space technology and the Johnson Space Centre that is connected to NASA since fall 1998. They are developing plans for the habitation module of the ISS that can be realized by a partial collaboration with engineers and astronauts. The Munich Space Chair, that was invented by architecture student Hans Huber in 1984 and reconstructed by space engineers of TU Munich, has been already in use on the MIR. The establishment of a user friendly system, emphasising clarity with defined organizational systems and light standards helps not only for easier orientation on board a space station, it is also an important psychological factor. Today psychologists and sociologists are also involved in exploring the effects especially in planning for long-term missions and the related isolation in a space ship or station. [88]

88 The time dimension of a space mission changes the parameters for the design of the space, which used to be dominated by technology and safety issues and is now expanded with psychological, sociological and architectural influential factors. Thus space travel now reaches a new stage in its development.

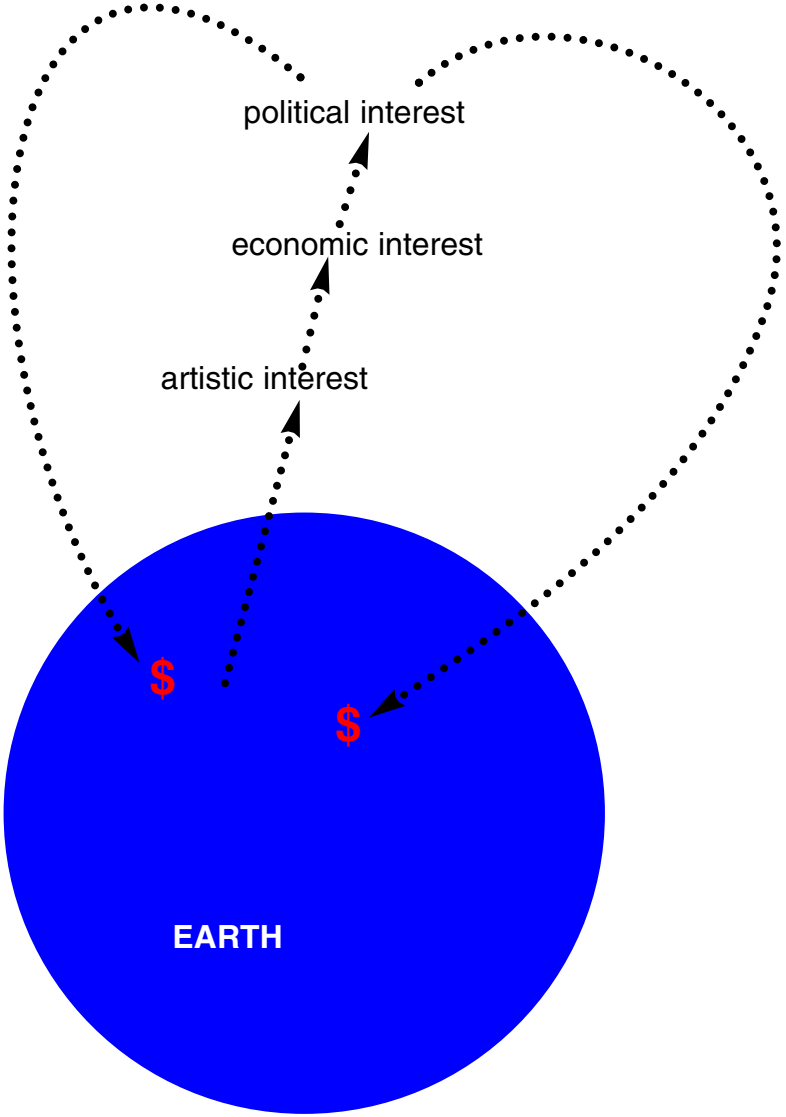
Space as a place

Still there is no real artistic practice in public outer space. No percentage rule exists for public art funding as it exists in some places on earth. Even nice decorative ideas need long preparation and can often not overcome the technical and financial difficulties. The danger of commercial appropriation of art is even higher in space then on earth. Artistic strategies could easily be used as models or surfaces for advertising campaigns.

Self-organized projects in the universe have to stay in virtual space because they cannot be realized technically and financially. The audience that is still mainly on earth can only be involved with enormous organizational effort. Surveys set up in large scale, translated in all languages on earth, and involving the whole earth's population finally would not lead to a satisfying result in terms of a participatory project. The artistic intervention in outer space in form of an individualist art practice could easily be seen as a compulsory measure.

The artistic view on the universe magnifies the difficulties of a critical practice for public spaces. Like a mirror it reflects the ideas projected into space and unmasks them as part of the expansion of capital. The way to a critical art practice in outer space is still long, although it seems to be essential and urgent facing the prospect of militarization and commercialization of the universe. We are dealing with an instrumentalized public space, but there is hardly the possibility to act critically.

Space became a market place of diverse interests. It is no longer the non-functional space of imagination but an occupied space of actual realization and appropriation. Terrestrial public space has found its way into the universe and expands the same as it always has.



Liaison sans amour

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