

Drift Painting in a Microgravity Environment And the Zero Gravity Arts Consortium

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INTRODUCTION

Space flight technology serves as a site where artists and space flight professionals can meet to learn from and collaborate with one another while sharing their unique experiences, thoughts, and observations between two cultures that share, I believe, similar dreams. Despite speaking unique languages and using different methodologies our desires to contribute to the enrichment of the human condition and improve the quality of life for all people is the same. In educating one another to the different worlds we inhabit; in discovering the similarities that exist when seeing ourselves in one another, despite the significant differences; a new cooperation will unfold and the discovery of a rich common language will expand the horizons of each of our cultures. For artists parabolic flight and space flight technology serve as a site where mediation takes place between science, artistic production, ritual, economics and politics. This site is as exotic for us as it is for scientists and space presents challenges and opportunities unlike those that artists find in our gravity-bound studios. Scientists have been able to expand their understanding of nature by going into space and the contributions to the human spirit that have unfolded prompts me to wonder how artists too might harness such experience to create new works that are sublime. This new art, one that can only be created through cooperation, may inspire wonder and awe in our scientific colleagues who are now called upon to play a significant part in the development of a new Space Art genre.

“The many energies and links are a fabric, all one,
But separate strands, each with its own knowledge and purpose,
Equally important, a flowing mesh without gaps.
The balancing of all these is the greatest form of love;
The clearest insight into truth is through joy!
Therefore be one with the earth as one would make the sand fire,
And the fire the sun.” Lowry Burgess, *The Quiet Axis* [1]

It is my hope that the European Space Agency, NASA and other space flight agencies will officially integrate artistic production into space missions. In order for this rich new

language to evolve, artists should have access to these technologies, as do scientists. If human space flight is to proceed successfully, then it is imperative for the arts to be harmoniously integrated into scientific space exploration.

I strongly believe that were astronauts to engage in artistic production as formal flight manifest activities, scheduled during long-term space missions, it would help reduce stress, decrease boredom, build stronger interpersonal bonds between members of international space crews and rejuvenate astronauts for a return to their scientific and analytic activities. Psychological, physiological and social benefits for people who produce art in microgravity should be quantified. It is my intention to expand my own work, as an artist, by developing collaborations with scientists working in the area of psychological human factors with the hope of adding to the body of knowledge relating to the impact and benefit that art making, in microgravity and during space flight, will have on the artist/astronaut. As a result of my recent appointment as Associate Fellow with the STUDIO for Creative Inquiry at the College of Fine Arts at Carnegie Mellon University, while working with Lowry Burgess as Co-Principal Investigator, I plan to fortify collaborations with faculty and staff to create controlled research experiments, before, during and after my next parabolic flight. I hope that such research will reveal if there are quantifiable psychological, physiological and social benefits for people who are engaged in artistic activities during space flight. As a part of my work at the STUDIO For Creative Inquiry, I also plan to work on research and development of the Zero Gravity Arts Consortium (ZGAC) that I will discuss later.

At this workshop we extend our hands out to welcome one another into a new education that will at first be awkward. Artists need to better understand the extreme conditions that astronauts actually face during their time getting to, living in and returning from space. The naiveté of a novice space artist like myself needs to be shattered through comprehensive education programs that bring artists to terms with the real challenges they will face in space and on parabolic flights. As a part of the preparation for my 1998 KC135 flight, NASA provided extensive education and training programs to help me begin to understand the new space of microgravity; but I was not prepared for the reality I experienced during parabolic flight. Consequently, I understand the requirement of educating and training space artists as rigorously as astronauts are trained. Kitsu Dubois [2] and her methodology for working in microgravity serve as an excellent example of how artists train for their work in weightlessness. Such investigation also helps the artist realize something the space flight technologists already know. Specifically, that this space must be experienced multiple times by an individual or that the period of experience in microgravity needs to be extended in order to establish first hand knowledge as to how the space (and the space flight agencies) operate. The need for ZGAC to fortify the organization's Space Arts Education Program is clear.

I believe that it would be a mistake to send one 'first artist in space' the very first time, space agencies send artists into space. I strongly advocate that an international team of artists should make this significant journey together so as to share the experience in community with scientific colleagues. The selection of the team is a symbolic act that can reflect the spirit of international cooperation. A team, rather than the one artist, better represents the diversity of our world, various disciplines and cultures, that colorful spectrum of differing points of view and cultures. I believe that no individual artist, nor their

chosen media or creative process can represent the significant development to use space flight technology for artistic production. The team must include people from the developing nations of the world, individuals who are economically disadvantaged to individuals who are wealthy. To support this vision, ZGAC has instituted its Building A Global Space Arts Community Program with the intention to bring people, from all over the world into our programs, especially those whose economics would preclude them from accessing these technologies and opportunities.

DRIFT PAINTING IN A MICROGRAVITY ENVIRONMENT

On April 4, 1998, I flew from the NASA Johnson Space Center, aboard a KC135 turbojet, to create 'drift paintings' as my body floated within the 3-D kinetic painting space facilitated by parabolic flight and microgravity. I painted by squeezing rainbow colored acrylic paints from pastry bags into the space surrounding my body. A 75-inch high by 48-inch wide by 52-inch deep plastic bag was tethered to the interior of the jet using bungee cords and Velcro. This 'creativity chamber' was to contain the floating paint while allowing for free-float body movement within the space. I filled 10", 14" and 18" pastry bags with acrylic gel medium, at the viscosity of toothpaste, and these tools were used to project the paint into the space surrounding my body.



Fig. 1. Frank Pietronigro 'Drift Painting' in Microgravity
Original Footage Courtesy of NASA

My participation in 7th Workshop on Space: Technology and the Arts, compels me to consider new methods and collaborations beyond the experimental stages of such art making. I now contemplate, with great anticipation, how we might transcend the challenges of working in microgravity studio spaces so that the process becomes second nature to artists. My future work in weightlessness will teach me more lessons of her limits, boundaries, and opportunities and it is my desire that a new creative aesthetic may develop that prompts more beauty and wonder in all who experience this new art form,

forms that exists because of mutually beneficial cooperation between artists and space flight technologists.

Background

Creating an opportunity to experiment with art in space has fascinated me for years. In 1974, an entry was made in one of my notebooks that outlined a proposal that I made to the Philadelphia College of Art to create paintings that floated in mid-air. Written when I was twenty-three, the formal concerns as to how the materials might be used to create art objects were my only considerations. Now that I have read Suzi Gablik [3], Greil Marcus [4], Julia Kristeva [5] and many other discourses on art and culture; the psychological, neurophysical, political and social aspects of collaborative art making in space are as important to me as creating works of art. Twenty-two years after writing that first zero gravity art proposal, a contact at NASA informed me of the 1998 Student Reduced Gravity Flight Program [6], sponsored by the Texas Space Grant Consortium [7], which provided access to microgravity space and allowed undergraduate student teams to propose, design, fabricate, fly and assess reduced-gravity experiments of their choice on NASA's KC135.

Observation On A New Space Art Form

“Drift Painting’ is not relegated to a static two-dimensional surface like traditional paintings. What results are paintings with an infinite number of compositions happening simultaneously, each in accordance to all points of view from which the work is viewed then interpreted. This process fosters a revolutionary step in the tradition of painting as it to destroy linear perspective, the fixed point of view, a convention that has been used by painters since the Renaissance. This is important because not any one point of view should dominate the way we look at the world. There are great advantages, in our democracy, where multiple interpretations of our experience are allowed to flourish. The opportunity to constantly shift how we see things will reveal layers of meaning. The ‘drift paintings’ created their own compositions but NASA space technologists and I facilitate the situation. Microgravity was an environmental contributing factor in the development of these ‘drift paintings’ and serendipity, not the hand of the artist, orchestrated the results.

The traditional paint stroke was liberated from its containment to a particular time and space, in contrast to it being permanently placed onto a canvas, because it now drifted with a momentum of its own, along with the body of the artist. As a matter of fact the process of ‘drift painting’ is zero gravity eliminates the art object completely. The actual artwork can be directly experienced only within the microgravity situation – a copy of the art cannot be made and the original work of art cannot be acquired through sale. Consequently, the commodity has been replaced by ritual action that was created with the purpose of building stronger community between artist and space scientists. The social and institutional structures that changed to support the dynamic interdisciplinary process are as important to manifesting the art as the energy of the jet.

It is my hope to be able to work in a non-alternating gravity microgravity zero gravity space. What kind of shapes and textures would evolve from paint floating in weightlessness over many hours, in a zero gravity art studio aboard the ISS? As an option

for those artists who want to create permanent traditional art objects, I would like to work with chemical engineers on developing a new liquid medium for application in zero gravity. The qualities of this new medium is that it would not give off any harmful odor or become a hazard in a confined space such as ESA's Columbus module, that it would come in various colors and viscosity, that it could mix well, that it would only adhere to itself so that if it touched any surfaces of the module or the people using it the material could very easily be removed from those surfaces, that it would have a drying time where it could be manipulated over the course of a few hours; but, when it dried it would solidify and be archival, unbreakable, compressible for transport back to earth and then expandable so that the original form created in space could be reconstituted to its original form once the art is brought back to earth.

The Art of Space Ritual

It was my desire to work within the realm of the symbolic, the artistic as well as the scientific. My choice in naming processes, methods and materials were impacted by symbolic, political, formal and scientific considerations. Project conversations, email, telephone calls and letters were considered as elements in a collaborative performance, with a fluctuating script co-authored by individuals involved, each adding a new voice or personal nuance to the narrative as the process unfolded. I 'drift painted' in a creativity chamber, that I named 'tabernacle' in order to site the basis of my work in ritual [8]. As a gay man, I found great humor in associating 'decorative tools' such as the pastry bags, that I used to create the painting, with formal art being created within a national institution like NASA. I attached magnetic loadstones to 'wands' and planned to use magnetism to help move the floating metal infused paint. I used these tools as a symbolic reference to magicians as a way of remembering the beginnings of science in alchemy. In associating my image with Merlin waving his wand, I wished that something magical might unfold within the space. I specifically wore 'worker boots' to symbolize the ability of different classes of people accessing such technologies.

Space Artist Experience From the Inside

In weightlessness, I meditated, listened to music and danced, made a drawing while blindfolded, then painted while experiencing motion sickness until the completion of parabolic flight. Equipped with my pastry bags, paint canisters, and goggles, everything floated around me as I experienced various forms of spatial and vestibular disorientation. I operated in a world where negotiation and conflicts evolved. I could no longer trust my senses, my body no longer functioned as it did when earthbound. It felt like the boundaries of my body disappeared and feelings of physical expansion facilitated what I experienced as a shift in consciousness. I sensed that time had simultaneously slowed down and yet passed as if in a flash. The evolution of the paint was unexpectedly ethereal. Everything from my point of view was moving in slow motion and what I felt on the inside was different from how others expressed their experience when seeing me from the outside. I was told that I was working in a fast, frenzied pace.

My consciousness drifted between the mystical and the rational. My real experience included sensations and emotions such as: throwing-up, fear, surprise, wonder, confusion, asphyxiation, elation, depletion, sweating, laughter, contemplation, panic, anxiety, and

sublimation. Analytic activities such as communicating needs, assessment and analysis of problems, then making quick decisions and creating immediate solutions to unexpected obstacles happened throughout the flight. Analysis complimented disorientation. Every action was elementary with little control over the outcome. My action appears to be a useless activity that produced nothing tangible and what was potent in zero gravity transformed under the influences of two gravitational forces. In the end, I was covered in brown paint, exhausted yet pleased with having been given this experience as a gift from my scientific colleagues. Did I loose control of my bodily functions? It took a lot of personal determination and power to get to that moment of Jouissance [9] but in that moment my will did not matter. I had lost all control and that fostered personal transformation.

The Science of Art and the Art of Science

"Space environments are characterized by isolation, confinement, deprivation and risk. Such environments may be expected to place heavy demands on astronauts' psychological and social resources. On many future missions, the perceptual field (both interior and exterior of a space craft) will be relatively unchanging." Living Aloft, Human Requirements for Extended Space Flight, by Mary M. Connors, NASA Ames Research Center [10]

To reiterate my hypothesis, I believe that art-making conducted during space flight will reduce stress, decrease boredom, increasing hand/eye coordination, and build stronger interpersonal relationships among astronauts, from different cultural backgrounds, when they collaborate together on creative projects in space. Art making does not carry with it the stress and dangers associated with many of the activities astronauts have to perform. Consequently, art can provide a means for non-threatening experiences where astronauts can come together to enjoy each other. Goals, tight production schedules and stress are taxing but in contrasts a 'non-objective' activity like 'drift painting' should prove beneficial. I imagine that many other benefits for astronauts will come to light as more research is conducted.

It is my intention to weave the methodologies of the psychologist and neuroscientists into my work but I was not successful in achieving this in 1998, despite trying to do so. I want scientists to work with me to increase knowledge relative to my belief that art making refreshes the mind and body for renewed analytic engagements, activities in which astronauts consistently engage. It is my intention to have my brain activity and other biological functions monitored, before, during and after flight, in order to make some observations, with collaborating scientists, about what happens between both hemispheres of the brain, while I am experiencing the analytic and non-linguistic based functions taking place during the creative process in microgravity, one-G and two-G force. Ideally this research should be conducted in microgravity aboard the International Space Station.

On March 1, 1998 I read Leisure Time Activities in Space: A Survey of Astronauts and Cosmonauts by Alan D. Kelly and Nick Kanas. [11] and this helped me understand that I was on the right track. They state in their paper, "Finally, variety was necessary, since people differ greatly in their preferences for leisure time activities." Kelly and Kanas, Leisure Time Activities in Space.

I would like to quote one of ZGAC Advisory Board member, in paraphrasing a New York Time Article [12] where Burke Fort, Director of the Texas Space Grant Consortium stated, "Pietronigro's proposal said 'creativity, when bridged with the analytic activities of the astronaut, will enrich the quality of life for future space travelers. The line blurs between science and art. . . I think there's a very fertile intersection of the two worlds. Art is personal creativity and a lot of what the space program is about is personal creativity. When the international space station is assembled and permanently crewed, humans would have to learn how to deal with the psychological and emotional challenges of being in space for a long period of time. What might be the emotional fall-out of never being able to go out on a sunny day, of looking out your window on the surface of Mars and seeing that pale blue dot (of the earth)?' Fort asked, 'How are people going to handle that?' Fort said that he suspects art would be one way."

INSIDERS / OUTSIDERS - THE POLICITICS OF SPACE ART

If space flight technologists and artists don't learn to understand each other's language, what are we going to do when we meet ET?

I realized that my artwork and the boundaries I crossed in order to do work in microgravity involved political action. I did this work as a member of a democracy with a sincere desire to help improve, in some small way, the quality of life for space travelers. I crossed into a new sphere when entering the world of NASA. I was an outsider to a group of space flight professionals who work on the inside of cultural institutions that have authority over and access to publicly owned technologies that can benefit the arts as well as the sciences. I wanted to be welcomed into their group despite the fact that my identity and the methods I employed were different from theirs. It was important to me to retain my artistic language and methods when working within the world of science as I was not willing to abandon my culture entirely in order that I may fly. By engaging in the production of art, in part, within NASA, I supported my belief that art creation in space would provide answers to some of the life science concerns for which scientists seek solutions.

Maintaining Artistic Integrity

As an interdisciplinary artist, I enjoyed this opportunity to learn the language of science, to learn about NASA's rich culture, and to consider how scientific research was a valid method for creating art. At NASA, I was participating within a traditional network of tenets that had its own historical development – its own distinctive practices. Yet my nature, as an artist and as a gay man, were a part of the social being whom I brought to the situation, despite sensing a policy of 'don't ask, don't tell.' I had to navigate through a conflicting set of directives and somehow balance NASA program directives, what I value, who I am and the aesthetic choices I was to make relative to an identity. Astronauts face the same challenge. How is a balance created within such space to honor diversity and the whole? In space, the art studio is no longer private; it is a public space. How could I as an individual contributing member of that democratic space honor who I am without completely subjugating myself to the directives and influences of the dominant cultural?

Compromise was the solution. The social situation calls for self-sacrifice as well as self-preserving behavior. I am a semi-autonomous self, located within an interrelated structure comprised of diverse forces of scientific and artistic methodology. Consequently, I have to take responsibility for artistic choices made within the social whole and such action must intend the creation and maintenance of democracy if more substantial action is to be possible.

It took me a very long time to consider and think about the artistic conventions and methodologies I would finally employ. It was my personal desire to choose artistic conventions that intervened in the political structures within the host institution for the purpose of creating what I believe are positive changes that will benefit the whole community. In some cases I pursued my own activities such as 'flag dancing and 'drift painting' then in other cases I pursued activities such as doing what I call a 'vertical inversion drawing' as suggested by the scientists at the Johnson Space Center's Neuroscience Laboratory. In honoring my own cultural heritage and my identity as an outsider to a group who have control over the property, I was staying true to myself while being sensitive to the customs of my hosts. Indeed, my choices to dance and paint showed me as the outside I am; but. I knew that engaging in such activities was symbolic of a larger goal in which I sincerely believed, i.e. that art making will keep astronauts sane during long-term missions to Mars.

Creating Access To The Technology

"I built up a theory and a system of sculpture and art, and also a system of wider understanding, anthropological understanding of sculpture as being related to the social body, and to everyone's lives." Joseph Beuys, Discourses [13]

Considering the work of Joseph Beuys, it is my intention that social relations, institutions and technology shape the art. Artists have to navigate the influences of forces that want to dominate the creation of the work – these include environmental forces, social practices, economics and institutional rituals. Because access until recently has been dominated by national institutions that need government funding, artistic action relative to space art is political. NASA and ESA's juridical and administrative spheres own the 'property rights' to their equipment despite the fact that artists pay taxes. I question why is it that only science, in terms of the economic and technocratic spheres, can occur within that space? I believe it is because the artistic profession as a whole is devalued. As an artist working within the aesthetic sphere, I support the individual's right to access those technologies supposedly owned by all taxpayers and support the full enjoyment of personal liberties even if those activities may be seen as useless.

We Have The Desire to Learn the Language of ET and Turn the Space Between Us Into Illusion

I was delighted to discover that every person, with whom I came in contact at NASA, at the local level, provided as much support as possible. Many of the scientists took great chances and career risks in supporting this work within the context of NASA and to those scientists and advocates, I am forever grateful. NASA staff truly offered the best service they could provide to people whom they knew were from another culture and they

sincerely wanted to help build bridges between our two worlds. This workshop, hosted by the European Space Agency, is yet another symbol of the desire on the part of space flight agencies to extend their hand in welcoming artists aboard.

ZERO GRAVITY ARTS CONSORTIUM

ZGAC is an artist created international space arts organization dedicated to fostering greater access for artists to space flight technology and zero gravity space through the creation of international partnerships with space agencies, arts organizations and leading universities. ZGAC is the first organization of its kind, based in the United States, facilitating parabolic flight projects that will set the stage for teams of artists to have permanent access to space transportation systems including the International Space Station. As Co-Founder and Project Director for ZGAC, I am working with artists Laura Knott and Lorelei Lisowsky, Co-Founders and Assistant Project Directors of the Consortium.

ZGAC programs include: the Artists Into Space Program, the Parabolic Flight Program For Artists, the International Outreach and Conference Program, Building A Global Space Arts Community, the Space Artist Education Program and Levity Lab: A Youth Space Art Program. ZGAC programs are established to foster the spirit of cooperation and strengthen relationships between the established space flight community of scientists and the global community of artists.

ZGAC will work to create an international network of affiliations to support our programs and services. To this end ZGAC has established the ZGAC Advisory Board, ZGAC Affiliate Institutions and the ZGAC Ambassadors. ZGAC welcomes inquiries from workshop participants on how they and their organizations can cooperate with ZGAC. ZGAC is currently partnered with institutions including the Zero Gravity Corporation, STUDIO for Creative Inquiry, College of Fine Arts, Carnegie Mellon University, the Texas Space Grant Program and the Foundation for Space Exploration. Zero Gravity Corporation is a private company who will facilitate parabolic flights for ZGAC and was founded and is operated by former NASA officials and astronauts who will provide training and technical support for artists participating in ZGAC flight projects. Lowry Burgess, ZGAC Advisor, and prominent Parabolic Flight Team Artist, proposes development of new networks of large universities and institutional support in Europe, Asia, India, and the US connected with ESA, NASDA, and NASA. Lowry is fostering increased collaboration within the space art community, in tandem with NASA, the Sparta Institute and the British Arts Council.

ZGAC Programs

One ZGAC goal is to contribute to international activities and dialogue, through our *Artists Into Space Program* thus setting the stage for teams of artists to travel into space. Political advocacy is a key feature of this program. Among ZGAC's initial projects are a series of parabolic flights created for artists taking place at various locations around the globe. Selection of artists will be international in scope. Future ZGAC Parabolic Flight Program plans include periodic flights that will feature college science and art students who will fly together. A national call for proposals will be conducted among teams of students

studying at arts and science schools who compete to fly experiments and artwork of their choosing. These parabolic flights are being co-organized with Burke Fort, President of the Foundation For Space Exploration and the Director of the Texas Space Grant Consortium and Lowry Burgess, Professor of Art at the STUDIO For Creative Inquiry at Carnegie Mellon University. Burke Fort was instrumental in setting up NASA's Reduced Gravity Student Flight Program as administered by the Texas Space Grant Consortium. A unique competition will be organized by ZGAC affiliate institutions in order to extend educational opportunities for selected college teams.

ZGAC's *International Outreach and Conference Program* is being organized by Lorelei Lisowsky, ZGAC Assistant Project Director, in support of our global outreach efforts in Africa, Asia, Latin and Central America, Europe, Australia, and Russia. ZGAC will host conferences as a way to build bridges between ZGAC and diverse global communities and provide educational opportunities, to stimulate ideas from different cultural perspectives on new projects. This program will provide bridges to parabolic flight opportunities for people, from around the globe, who would not otherwise have access. Laura Knott, past research fellow at the Center For Advanced Visual Studies at the Massachusetts Institute of Technology and ZGAC Assistant Project Director is spearheading ZGAC's Building A Global Space Arts Community program. Although geopolitical divisions and nationalism have characterized the exploration of space, the effort has always been global in scope. One indicator of the global reach of international space programs is the extensive network of terrestrial tracking stations operated by various space agencies. NASA and ESA alone operate tracking stations on five continents and the Pacific Islands. Although primarily located in remote areas, stations make visible to local populations that research is happening 'out there.' Tracking stations offer a unique opportunity to extend the space art community to include artists familiar with space exploration through the existence of a local tracking station, but who have no access to facilities or training. The Global Space Arts Community at large is intent on bringing together artists based near tracking stations inviting participation in ZGAC's training, educational and parabolic flight programs.

ZGAC's *Space Arts Educational Program* will mentor artists as a way of building long-term commitments between space artists and space agency programs. ZGAC will institute and formalize the Space Artists Education Program in order to teach space artists about space art methodologies and media, space art history and historical precedents, space art project organization and logistics, space agency relations, programs and opportunities, and other topics that fortify the success of future space artists. As a part of my Associate Fellowship at the STUDIO For Creative Inquiry, I would like to propose the establishment of the first Space Art Research Center in the College of Fine Arts at Carnegie Mellon. ZGAC Levity Lab: Youth and Space Art Program offers opportunities for elementary and high schools students to participate in ZGAC Parabolic Flight Programs, joining artist flight teams on virtual field trips aboard the jet so they can directly participate in space art projects. Students will experience ZGAC's parabolic flights through live, interactive Webcasts that virtually take them aboard a ZGAC parabolic flight. ZGAC Parabolic Flight Webcasts will be available in classrooms worldwide through this Distant Learning program. Educators will be provided with support materials to include in-class, hands-on exercises, and a history of space art and directions on how to participate in ZGAC Parabolic Flight Program's Virtual Field Trips.

FUTURE PROJECTS

Space Wishes

It is my intention to create this work for implementation on a future ZGAC Parabolic Flight that will be flown over Olympia, Greece in conjunction with Carnegie Mellon's Sparta Institute, Artopos [1] Zero Gravity Corporation and other partners. Lowry Burgess will further describe the connection between the Sparta Institute and this ZGAC Parabolic Flight in his paper. *Space Wishes* is a collaborative microgravity arts project that will exist between the earth and the sky in an alternating gravity environment of parabolic flight. The goal of the project is to create a situational 'topos' - a three dimensional and/or virtual space + a situation, an "etat d'esprit", a "ba" as defined by Kitaro Nishida [14] based on trust, love and community. This place of connection will facilitate knowledge exchange synthesized by a microprocessor reading incoming digital messages from an audience viewing me floating wearing flexible robotic wings. These wings will be dynamically and technically responsive to the wish messages sent from the gravity bound world to the weightless portions of the "topos". People outside the weightless portion of the "topos" will be able to send digital messages expressing whatever they wish using compressed digital video, audio including cell phone messages, and text files. Readings will be taken of my heart rate, breathing, epidermal, other responses. The artists as mediator, receptor, floats between 2Gs and microgravity, moving between the earth and the heavens. It is my intention to enrich this portion of the work through collaborations that will be created as a part of my Associate Fellowship with the STUDIO For Creative Inquiry. Within the weightless "topos", the author after having been 'touched' in someway (inferring the Greek hero Epafos, king of Egypt and patriarch of Egyptians) [15] by these wishes, will serve as an 'enabler' who will interpret, without any conscious intention, respond to the wishes by sending messages back from the sky to the earth. My biological responses will couple with the incoming digital wishes and transmit back new knowledge interpreted by the program that in turn creates a dynamic responses in the wings. New stories will be symbiotically created between those in gravity and the floating artist.

Anna Hatziyiannaki, of Artopos in Athens, Greece [16] wishes to address the relationships between Utopia and Myth infusing the collaboration with conventions that reflect ancient Greek mythology and contemporary art theory. She wants the "topos" to be infused with multi-sensory experiences. Dimitris Skoufis [1] introduces the concept of 'ba' (currently used in modern Knowledge Management theory and practice [Nonaka and Konno, 1998]). Dimitris wishes to support the "topos" by building a virtual and real-world communication bridge between local communities and the larger world community.

REFERENCES AND NOTES

- [1] R. Vezino, Burgess, *The Quite Axis*, (Quebec, Canada: Editions du Trecarre, Saint-Laurent, 1987).
- [2] K. Dubois, "Dance and Weightlessness: Dancers' Training and Adaptation Problems in Microgravity," *Leonardo*, Vol. 7, No. 1, 57-64 (1994).
- [3] S. Gablik, *Has Modernism Failed?*, (New York, NY: Thames and Hudson, Inc., 1984) p. 43.

- [4] G. Marcus, *Lipstick Traces, A Secret History of the Twentieth Century*, (Cambridge, MA: Harvard University Press, 1990) p. 440.
- [5] 14. J. Kristeva, "The Subject In Process" in *The Tel Quel Reader* ed. Patrick French and Roland-Francois Lack, (London and New York, NY: Routledge, 1998) p. 134. "Plato's interpretation of the chora designates a mobile receptacle of merging, contradiction and movement, necessary to the functioning of nature before the teleological intervention of God, and that it corresponds to the mother: the chora is a matrix or a source of nourishment in which the elements are without identity or reason. The chora is the site of a chaos which is and which becomes prefatory to the constitution of the first measurable bodies." (Julia Kristeva, footnote p. 174).
- [6] Link to NASA's Reduced Gravity Student Flight Program: <http://microgravityuniversity.jsc.nasa.gov/>
- [7] Link to the Texas Space Grant Consortium: <http://www.tsgc.utexas.edu/>
- [8] Walter Benjamin, "The work of art in the age of mechanical reproduction," *Illuminations*, trans. Harry Zohn, (New York: Schocken, 1978), pp. 223-224.
- [9] I use the term '*jouissance*' here to amplify the ecstatic sense of bliss and exhaustion I was feeling at the time. I also use the word to reference Roland Barthes's use of this French colloquialism, thereby importing into this text Barthes's sense of his subject's shattered boundaries. Barthes displaces the certainties of self and destabilizes the space that holds oneself in place. My historical, cultural and psychological assumptions were brought to a crisis by my action and by my relationship to and use of language.
- [10] M. Connors, *Living Aloft: Human Requirements for Extended Spaceflight*, (Washington, D.C., SA Scientific and Technical Information Branch, 1985).
- [11] B. Kelly and K. Kanas, "Leisure Time Activities in Space: A Survey of Astronauts and Cosmonauts," *Acta Astronautica*, Vol. 32, No. 6, 451-457 (1994).
- [12] M.G. Lord, "Slow Motion Dance For Art," *New York Times*, Vol. CXLVII, No. 51,272, 30 (September 6, 1998).
- [13] Joseph Beuys, quoted in R. Ferguson, W. Olander, M. Tucker and K. Fiss, *Discourses: Conversations in Postmodern Art and Culture* (Cambridge, MA and New York: MIT Press and the New Museum of Contemporary Art, 1990) p. 186.
- [14] Nonaka, Ikujiro and Konno. Noboru: The concept of "Ba": Building a Foundation for Knowledge Creation (1998) *California Management Review* 40(3). Note that in the above paper Nishida is credited with the origins of ba but the concept was extended by Shimizu in Shimizu, H.: "Ba-Principle: New Logic for the Real-Time Emergence of Information," *Holonics*, 5(1), 1995.
- [15] *Epafos, son of the god Zeus and the lunar deity Eos, took his name (epafi in Greek means "touch") because Zeus touched his mother. The myth: Zeus, the father of Olympian gods, falls in love with the lunar deity Eos, gave rise to Hera's (his wife) jealousy. Eos, was metamorphosed in a cow and had been exiled and purchased by a fly that was eating her. One day, she arrived in Egypt, where she became again a woman and gave birth to Epafos.
- [16] A link to Artopos: <http://www.artopos.org/>