

Etherospermia: Conceptual art, science and allegory in the sky-seeding project[☆]

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ABSTRACT

This paper presents the practice of the artist/researcher Ioannis Michaloudis. It showcases his use of a space technology nanomaterial, silica aerogel, and its potential in the cultural utilization of space. Since 2001, his projects have centered around the esthetic, sculptural and conceptual use of silica aerogel. For Michaloudis, this material is highly allegorical of what he terms 'our breaking sky'. For the authors, the step towards space is a real 'bridge moment', analogous to the evolutionary progression of organisms from water to earth. In this current era of space exploration, it is clear that humans need to develop new organs and survival skills – or, cultivate new skies in response to the breaking of our atmosphere's dome. It is also clear that science and art need to collaborate more productively. To this end, it is argued that allegory provides the link between imaginability, experiment and representation in both scientific and artistic practices. *Etherospermia* (εθεροσπερμία) is an invented word from *ether* and *panspermia*. The *Etherospermia* project pursues, allegorically, the creation of new atmospheres on other planets, in order to draw attention to the degradation and destruction of the earth's protective veil. Imagine an astronaut who, during a space walk, scatters fragments of Michaloudis' silica aerogel as seed material to alter the atmospheres of other planets, making them habitable. The paper discusses nine artworks as a way of presenting the conceptual core of the *etherospermia* allegory.

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1. Introduction

Etherospermia is an invented word based on the terms *ether* and *panspermia*. It seeks to become the evolution of *panspermia*, the next step for life. The theory termed *panspermia*, relates to the idea that life was brought to our planet. The term *ether* signifies the quintessential substance which permeates the universe.

Since 1989, when NASA released the first payload of art by Lowry Burgess into outer space, the relationship between

art and space science has been evolving rapidly. Space Art has begun to flourish with such artists as Burgess and Joe Davies, who seek to explore the relationships between space, science and art. Michaloudis started his art research in 1992 with Land Art projects. In 2001, his practice shifted to Sky Art with the project (*Nephele*)³: *the Cubic Cloud* at MIT. Through the use of the immaterial silica aerogel and its esthetic qualities which mimic our sky, Michaloudis has become increasingly engaged in the production and performance of Space Art.

His works explore an ethereal substance named silica aerogel. Aerogels are excellent thermal and sound insulators, with 99.98% of their volume being pure air. They are the lightest solids ever produced, and in May, 2002, received the Guinness World Record as the least dense

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solid in the world. Silica aerogel is an amorphous form of common sand which is nonflammable, nontoxic and environmentally safe. It is used by NASA as a heat insulator for spacecraft and for the collection of stardust. The blend of silica and air offers the possibility of its use as a new artistic medium based on the amalgamation of its esthetic, conceptual and poetic qualities.

For example, the concept of catastrophe is explored in the interactive installation *My First Time I Touch a Cloud*. This *in situ* project seeks to find a balance between the tangible, 'real' world in which we exist, and the uncertainty and beauty of the ethereal, reminding us of our material way of life: a clouded vision which can nevertheless be refocused as a clear gaze beyond the ether.

After outlining a rationale for the methodology adopted in the paper, the discussion considers a range of artworks in the light of the broad allegorical figure of *etherspermia*. The paper concludes by suggesting that in the contexts of atmospheric and environmental degradation, the 'sky-seeding' project invites a radical re-envisioning of the nexus between the situated practices of science and art.

2. Rationale

In an essay entitled 'The Question Concerning Technology', the philosopher Martin Heidegger observes: 'the essence of technology is by no means anything technological' ([4, p. 4]). Elsewhere, he claims that 'in no way...is the essence of the mathematical defined by numberness' ([5, p. 119]).

Following in this vein, the rationale for this paper proceeds from the provocative assumption that the essence of the practice of science is, *ipso facto*, nothing scientific. What does this mean? That science can never be expected to explain and understand itself merely by having recourse to 'scientific method'?

Under close scrutiny, even a precise 'representamen' (sign) in scientific discourse (based on numbers, symbols and words in natural language) can be shown to be subject to undecidability and ambiguity. This is despite the relative certainty provided by the inductive momentum of empirical methods which marshal these sign systems in support of claims which are deemed to be necessarily or probably true.

Habermas [3, p. 118] confirms this conundrum, observing that 'the explanation for the phenomena that have become objects cannot be sought at the level of the phenomena themselves', and thus meaning will have to be established through ideas, or 'conceptually' and through the application of an 'archetype'.

The use of archetypes is often associated with mythology, but as Deleuze and Guatarri [2, p. 164] point out, 'there is a fundamental convergence between science and myth, embryology and mythology, the biological egg and the psychic or cosmic egg...'. They insist that the egg is not existentially *prior* to the organism, it is proximal to it, and 'continually in the process of constructing itself'.

Such a view is in accord with the notion (also used by Deleuze and Guatarri) of the concept of a *logos*

spermatikos, which, for the ancient Greeks, was the generative principle of a universal matrix out of which all things originate, and into which they eventually return.

This is not the place to present an extended critique of the prevailing ideology of scientism, characterized as the current 'age of the world picture' ([5, p. 115]). Rather, the aim is to show how artistic practice must be part of such a critique because of its power to produce endlessly recuperable (and regenerating) meanings through the 'logic' of its procedures.

This 'logic' is rooted in the form of the second-order, metaphorical and allegorical figure denoted by the terms *phantasma* (Greek) and *simulacrum* (Latin), which not only draw attention, in a self-reflexive way, to the processes of representation, but also open the 'meaning-content' of artistic discourse to the possibility of multivalent conceptual transformation.

Extending this analogy of procedural logics to account for human existence 'in the world', it seems reasonable to assume that both the Gaia Hypothesis (explaining the complex evolutionary nexus between biotic and abiotic elements of the world), and the philosophical premises of Deep Ecology, support a worldview which gives primacy to 'being' (ontology), over 'knowing' (epistemology).

It is no mere coincidence that Kant required the heuristically guided reasoning of his esthetics – in the form of the reflective judgement – to unify the conceptual schemata of epistemology and ethics developed in his first and second *Critiques*.

His identification of an antinomy at the center of human judgement results in a bifurcation into terms which signify a mutually exclusive human response to phenomena: the 'determinant judgement' and the 'reflective judgement'. ([7, pp. 213–214]). For Kant, the reflective judgement is an approach which prompts us to search for a universal category or explanatory principle when we encounter an object for which no universal is given. This process of evaluation which leads to speculative interpretation is clearly allegorical in nature.

Kant's explication of the antinomy of judgement which arises when we encounter objects in nature and art, is more than just a reworking of the maxim that no inductive argument can be validated deductively. Indeed, it opens the way for the possibilities of creative transformation at the heart of descriptions of phenomena, both 'scientific' and 'esthetic'.

Albeit in different ways, the approaches of Kant, Heidegger, Habermas and Deleuze all confirm the view that the practice of science entails the ongoing production and reworking of allegories. But science can rarely disclose this 'secret' to itself, since its fundamental procedure, the experiment (and its representation in numbers, formulae, binary codes, diagrams, tables and iconic images) may be called into question.

As is well known, scientific work periodically transgresses the practices of what Kuhn [8] calls 'normal science', causing a crisis which leads to a paradigmatic reworking and realignment of the dominant conceptual and methodological orthodoxies of that science. This process, in turn, reestablishes the logic and primacy of the experiment, as the site at which the allegorical is

repressed and thus, for the most part, concealed. Despite this, the necessary repression of the allegorical modality of the experiment leads, ironically, to richer ways of allegorizing. The problem of representing science-as-practice is evident in the play of meanings in between the English word 'experiment' and its French equivalent 'expérience', and in the description given by Heidegger [5,4] of such practice as a kind of 'representation-building', to the point at which the experiment becomes possible.

Clearly, the experiment can only be legitimized as representation through allegorical-narrative form, and in this sense, the meaning of an experimental event is 'conferred, reciprocally', by the allegorical *account* of that event ([1, pp. 136–137]).

The *Etherosperemia* project is, therefore, not only an 'experiment' which partially conceals its allegorical nature, it is also an 'expérience' which liberates and opens that allegory into the richest possibilities of imagination and interpretation. Paradoxically, the project represents both a critique of science and also an intervention which provokes its development.

What follows is a presentation of artworks centered around the trope of 'the sky', and more specifically, the idea of *etherosperma*, the sky-seeding project.

3. Land art

The interactive installation *In the Circulation of Red Trees* (fr. "Au Circuit des Arbres Rouges" – Fig. 1), was



Fig. 1. *Au Circuit des Arbres Rouges* – (*Paulownia Imperialis*), Paris, 1994. Photograph: Ewa Rudling, © SIPA Press.

installed in June, 1994, inside the park of City University in Paris, France.

This land art project was part of Michaloudis' doctoral thesis investigating the elastic space between visual and applied arts. The installation was realized 'with the use of recycled industrial materials: 250 sq m of red elastic fabric and 800 sq m of fishing net for the bandage of the two trees, and 350 m of strap connecting the trees through the building of the *'Maison Internationale'*'¹

This work pointed to new directions in the artist's practice. Observing the very sharp hook-form of a cloud in close proximity to the bandaged *Paulownia Imperialis*, Michaloudis recalled an idea he once had of a *Square Cloud* over a town.

'From this square, out of this *veduta* placed in the blue sky, out of this white window, is where he (the author) wants to seesaw upwards beyond' (Michaloudis, 1998).²

The (*Nephele*)³: *The Cubic Cloud* project was started from this observation and became the motive for his presentation at the last Sky Art Conference in 2002. Nevertheless, Michaloudis had to forsake the *Cubic Cloud* because of its extremely high cost: the invisible container for the cloud would have required CO₂ lasers and the electrical energy of two big towns.³

4. Sky art: aer()sculpture

A chance encounter with a researcher at MIT, led to Michaloudis' introduction to the space nanomaterial silica aerogel, and his realization of its potential for producing 'immaterial sculptures' made from the lightest solid on earth.

In "Aer()sculpture: A Free-Dimensional Space Art", Michaloudis writes on memory: '...If humans are (organic) carbon-based representations, we could suppose that every aer()sculpture is an (inorganic) silica-based representation. We know that silica – the natural glass – is a basic component for the fabrication of data storage devices. If we accept the hypothesis that one day silica will be the Bank of all human memory, then we can surely say that every aer()sculpture travels also as a Memory Ark...'⁴

Michaloudis uses the pun ['free' – and not 'three'-dimensional] in determining the case of the indefinite transparency of his aer()sculptures, as a non-Euclidean space. Silica aerogel itself can be considered a personification of what the French mathematician Henri Poincaré

¹ Kazolea K., "Michaloudis I. (Michalous)", in *Dictionary of Greek Artists*, ed. Medusa, 1999 vol. III, pp.138–139, Greece, EU, ISBN: 960-204-224-9.

² "Androgynous' Garment: (C)over an elastic parenthesis in the field of art", last words in author's Doctorate in Arts and Sciences of Art, University Paris I (Pantheon Sorbonne), Paris, France, EU, 1998, cf. <http://www.worldcat.org/title/habit-dandrogynne-couvrir-une-parenthe-se-elastique-dans-le-champ-de-lart/oclc/491230091>.

³ Monreal B., Michaloudis I., "(Nephele)"³ Sculpting of clouds using high-power lasers", in *Sky Art Conference 2002*, MIT, 2004, ISBN 0-9766549-0--3, pp. 96–99.

⁴ 'Another legend wants the aer()sculptures to be transferred by spacecraft to other planets in order to be used for a NASA's Sky Cloning Project, cf. <http://www.skyforsale.com/>, footnote of the paper.

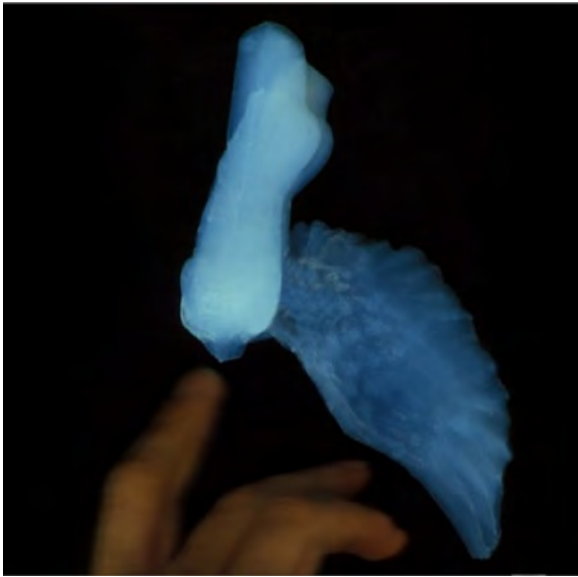


Fig. 2. 'Icare...I care', silica aerogel. Photograph and ©Michalou, 2002, CA, USA.

named a 'representative space', a space you cannot measure; you just live in with all your senses.⁵

The first *aer()sculpture* made from this ethereal material was '–Icare...I care', (Fig. 2) and was realized in collaboration with Dr. Michael Droege, of Ocellus Inc. In this sculpture, the torso is thicker than the wing, and for this reason, when white light scatters at its silica and air components, the torso of *Icarus* appears bluer than the blue-transparent wing. Every *aer()sculpture* appears blue only when its background is black. The same optic phenomenon – raylight scattering – explains why our sky is blue, as behind it lays the darkness of chaos.

Since the creation of *Icarus*, the first ever aerogel silica sculpture, Dr. Michael Droege has been our main collaborator. He designed the space technology apparatus shown in Fig. 3. In 2005, Ocellus Technologies Inc. installed the double vessel of a 20+1 l high-temperature supercritical drying system in Michaloudis' workshop in Greece. Since then, all the *aer()sculptures* have been created in the 20 l large vessel (diameter of 24 cm and height of 42 cm). The small vessel of 1 l is for sampling, research and development. Using a new, two-step condensed silica process, Ocellus Technologies produces a light aerogel that contains 99.98% air.

Ocellus make silica aerogels in a patented process that begins with a partially hydrolyzed silica solution to which they add water, a solvent, and a basic catalyst to form a gel. They then remove the solvent by supercritical conditions in an autoclave and replace it with air. This process takes a few hours; other methods can take days or weeks. Moreover, the process is flexible enough to let us produce aerogels with a wide range of densities from 0.7 to



Fig. 3. Supercritical drying apparatus. The artist opening the vessel after 48 h of constant running. Photograph and ©Massimo Pizzocaro, 2008.

0.001 g/cm³. These data and Fig. 3, indicate that even the production of 'etherality' is dependent upon the heavy 'materiality' of an apparatus and process used for supercritical drying.

5. Space art

The *Etherospermia* project – using the space technology to create the *aer()sculptures* – situates itself alongside the work of other space artists such as Lowry Burgess and Joe Davies. Although diverse in practice, their works lead the way in connecting the realms of science and art. As discussed above, science and art often appear to stand apart in regard to the objects with which they concern themselves. However, a focus upon *ether* is of common interest. For centuries, humans have envisioned the sky and beyond – signified here as *ether* – to be that of a place of sublime and transcendental quietude and mystery, or as a possible source of new life. The heavens have always been out of reach, always in sight, but never to be touched. Yet we project ourselves into the skies, into the stars, forever seeking answers.

Lowry Burgess was the first artist to have an official art payload taken into outer space by NASA, in 1989. His work entitled *Boundless Cubic Lunar Aperture* was sent alongside the Discovery shuttle. The cube is made up of an inner and

⁵ Michaloudis I., "Aer()sculpture: A Free-Dimensional Space Art", in Aegerter M.A, Leventis N., Koebel M., *Aerogels Handbook*, Springer 2011, ISBN 978-1-4419-7477-8, chapter 35, pp. 791–810.

outer cube. The inner cube is a vacuum surrounded by holograms of nothing. This cube floats within the half-filled outer cube of water collected from big river systems across the world. Burgess describes the water as containing every element on the periodic table in his construction for what is everything: life. Nothing floats in everything as a monument to life on Earth. Burgess also stated that this selection by NASA to create the first official art payload was based on the artwork not being completed until it was in orbit.

The practice of Joe Davies specifically explores the nexus between art and science. Davies does not see himself as an artist or a scientist, but as a practitioner. He exploits the known with the unknown, 'fact' with 'fiction'. An example of this is *Microvenus*, where Davies constructed molecules of synthetic DNA that were representations of the external female reproductive organs. Coincidentally, he had also created an ancient Germanic rune depicting the female Earth. Davies, a known believer of extraterrestrial life, believes that this work is acting as a radio message into deep space.⁶

Space Art is becoming more than the mere application of art into space. It is also the consideration of space as a medium. With the collaboration between scientists and artists⁷, the boundaries of technologies and equations are being experimented with and reassigned. Space, as a site for artworks, provokes thought of extraterrestrial life, the origins of our existence, and the future 'beginnings' within the universe itself – evocative of the *logos spermatikos*, as defined above.

The medium of space offers artists the chance to explore traditional methodologies of art within new contexts of zero gravity, the moon, planetary orbits and a plethora of as yet unimagined possibilities. Our idea of an astronaut who, during a space walk, scatters fragments of silica aerogel/skyspores – so as to seed material to alter the atmospheres of other planets and make them habitable – echoes the need of humankind for a new habitat. *Etherospermia* can be considered a kind of allegorical terraforming project, with the artworks discussed below as crucial elements in this analogical process.

5.1. Climatic sculpture

A Piece of Sky Between Your Fingers (Fig. 4), is the first successful experiment of creating a cumulus cloud within a fragment of hydrophobic silica aerogel, exploring the enigmatic idea that a cloud can be held between one's fingers. This test, on the nanostructure of silica aerogel, was a serendipitous research 'accident' during Michaloudis' residence at the Physics Department of Shivaji



Fig. 4. *A Piece of Sky Between Your Fingers*, hydrophobic silica aerogel, water, India, 2004. Photograph and ©Michaloudis.



Fig. 5. *A Portable Sunset*, water vapors and hydrophobic silica. Photograph and ©Michaloudis, 2002, MIT, MA, USA.

University, in Maharashtra, India. We understand, as discussed, that the blue color of the silica aerogel is due to the raylight scattering and the black background. The white cumulus cloud in the sample is created using water vapors, and is the same atmospheric phenomenon as cumulus clouds forming near mountain peaks.

The work *A Portable Sunset* (Figs. 5–7), shows another successful experiment realized two years earlier at MIT. There are two reasons for the title of this work. The first, obviously, is the Mie scattered sunset color of all three images (which is obtained by keeping a piece of hydrophobic silica aerogel between a white light and the camera). The second reason for the title is that hot water vapors were imprisoned within the mesoporous structure of this sample. These vapors had created a lenticular cloud that completely disappeared after 9 min (the series of three photographs were taken 3 min apart). In every *aer()sculpture*, the orange–gold hue can appear if we keep the sculpture between our eyes and light; then the sculpture has an orange and not a blue hue.

Thanks to a black and glossy surface behind the sculpture, we can focus, simultaneously, on the magnificent sky-blue and sunset-orange natural colors of the *Double*

⁶ Michaloudis met and collaborated with Davies at MIT during his research on the *Cubic Cloud* 2001–2003. Along with Burgess, they met during the *Sky Art Conference 2002* in Greece and at the *Workshop on Space Artists' Residencies and Collaboration*, February 10–12, 2005, Carnegie Mellon University at NASA Ames' Research Center, Moffett Field, CA, USA.

⁷ Between 2007 and 2010 Dr. Michaloudis undertook a contracted collaboration with the National Hellenic Research Foundation (NHRF) and the European Space Agency/ESTEC for the project "Aerogel Systems for Space and Terrestrial Optics" under the contract number 21157/NL/PA.



Fig. 6. A *Portable Sunset*, water vapors and hydrophobic silica. Photograph and ©Michalous, 2002, MIT, MA, USA.



Fig. 7. A *Portable Sunset*, water vapors and hydrophobic silica. Photograph and ©Michalous, 2002, MIT, MA, USA.

Sky (Fig. 8). Apart from the sky-blue color observed previously, here we also observe another important color, an orange-gold hue. This orange-gold hue comes from a reflective transparent sheet on which the artwork rests. The shape of the cloud, its reflection, can clearly be seen. However, if this is the sky's mirror-image, why is its color orange rather than blue? Only the phenomenon of Mie scattering can explain this visual enigma. This orange hue results from the light that transpires the aerogel hemisphere and travels on the top of the plastic sheet, where it is reflected to our eyes as an orange color. In fact, as we have observed in relation to the *Portable Sunset*, if we keep the sculpture between our eyes and a source of light, the sculpture will have an orange rather than a blue hue.

It is these natural color characteristics of silica aerogel which give the impression that holding a piece in one's hand, is like holding a piece of sky.

Through the creation of fragments of sky, where the ephemeral becomes permanent, Michaloudis has developed



Fig. 8. *Double Sky*, silica aerogel, $20 \times 20 \times 10 \text{ cm}^3$. Photograph, ©Michalous, 2011.



Fig. 9. *My First Time I Touch a Cloud*. Interactive video installation. Photograph and ©Michaloudis, 2011, Istanbul.

ways to replicate different formations of clouds in the silica aerogel that mimic natural cloud formations. One of Michaloudis' ongoing projects is to realize silica aerogel sculptures in which the clouds appear, move and disappear within the sculpture. With this aim in mind, the author is currently collaborating with Dr. Daniel Cziczko at MIT's Department of Earth, Atmospheric and Planetary Science Laboratory, on a project entitled *Climatic Sculptureality*, where the clouds within the silica aerogel sculptures will become a controlled microclimate. This exploration of the climatic sculptures transforms Michaloudis' clouds into active climates, whereby they will become 'captured' atmospheres.

6. Catastrophe as creation

The interactive installation *My First Time I Touch a Cloud*, (Figs. 10 and 11) is an allegorical response to the potential chaos being caused by catastrophic climate

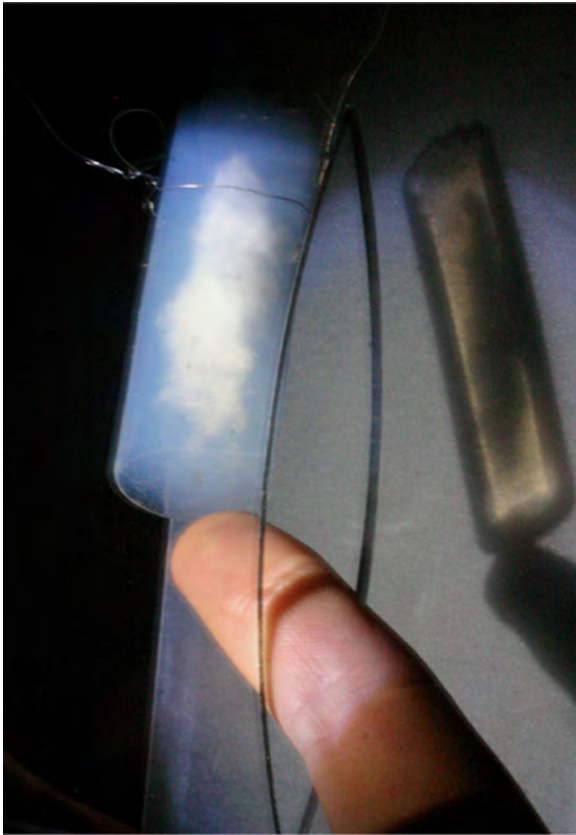


Fig. 10. *My First Time I Touch a Cloud*, interactive installation. Photograph and ©Michaloudis 2011, Greece.

change. It seeks to explore the ‘bottled message’ within a breaking sky.

The idea of this interactive installation emerged from Michaloudis’ interest in the potential to embody the concept of ‘catastrophe’, and the implications for this in his own work. The title of *My First Time I Touch a Cloud* plays with the notion of ungrammaticality in ‘the brokenness’ of a child’s innocent misuse of correct grammatical form. Substituting the definite article with the personal pronoun ‘my’, and the past tense ‘touched’ with the present/infinitive ‘touch’, the title evokes the fragility, ephemerality and ‘breaking’ of ether.

To think allegorically about ‘brokenness’, the term ‘catastrophe’ must be considered more closely. From Greek (*katastrophe*), the word signifies ‘breaking’ and ‘rupture’. The fertilization of an egg occurs when a sperm penetrates its boundary, but in this moment of disruption, breaking and rupturing, life is created. The implication is clearly that the creation of life is not possible without a moment of catastrophe.

By observing moments of catastrophe we must prepare to respond to our breaking atmosphere. ‘We must, paradoxically, control ourselves in order to command nature – by accepting limits, preserving balance, and respecting interrelationship’ ([10, p. 109]). Our existence is in balance with nature, as we ourselves are part of it. This existence, although impermanent, is having sudden, permanent and



Fig. 11. *Bottled Sky*. cf. <http://skyforsale.com> Photograph and ©Michaloudis 2007, Greece.

dramatic effects on Earth. In response to this moment of catastrophe, the imperative is clear: we must prepare ourselves for a moment of creation.

In attempting to make the impermanent a tangible experience, the works of Michaloudis explore the realms of his chosen materials to the limit. On the basis of demonstrating this idea of ‘catastrophe as creation’, Michaloudis proposed that the interactive installation *My First Time I Touch a Cloud* would sit alongside the paper *Ethospermia: The Sky-Seeding Project*, during the 64th International Astronautical Conference in Beijing.

In recent times, climate change and related ‘greenhouse’ phenomena have presented humankind, for the first time, with an almost unthinkable question: will the sky continue to surround our planet? The interactive installation *My First Time I Touch a Cloud*, responds to this, allegorically, by placing the viewer in a ‘take-care-of-the-sky’ position. On a screen is projected each visitor’s way of caressing this piece of sky: experiencing the sky-fragment as something unique and precious – or as a new material to explore – and being invited to reflect on the extreme possibility of the earth losing its protective atmosphere. The installation echoes this urgent call by sending an S.O.S (Save Our Sky) message for the planet’s life-protecting veil.

My First Time I Touch a Cloud has an audio accompaniment which creates an all-encompassing soundscape. The

music for this audio is based on the S.O.S Morse Code distress signal (... _ _ ...), and the installation invites the viewer to touch what seems to be a fragment of the atmosphere in danger. As the viewer touches the cloud, a camera records the experience and projects this touch live to a monitor outside the exhibition space (Fig. 9). The experience of touching something as impermanent as a cloud is utterly unique. The curiosity and innocence evoked by this touch act as a reminder of the broken sky-dome. The audio that is played alongside this work is an SOS that projects the need for us to respond. The question arises: do we, the participants, become the atmosphere's saviors – or its explorers?

Such a question reflects the cautious wonderment with which participants engaged with this installation. It also indicates an ambivalence, and an emotional response vacillating between exhilaration at the first touch of the cloud, and mild frustration (indicated by smiling) when they fail to insert a second finger to hook the cloud. Participants also seem genuinely surprised when they later observe the quasi-violent actions of others displayed on the monitor.

The concepts of 'breakage' and 'rupture' are central to the allegorical meaning in *My First Time I Touch a Cloud*, and are linked to the notion of catastrophe as the necessary precondition for creation in the trope of *etherospermia*.

The breakage of the sky-dome in *My First Time I Touch a Cloud* is not only a metaphor for the rupturing of Earth's atmosphere. It also signifies that our existence will come to an end if we do not respond with concern to this urgent SOS. The fragments of the broken dome must be gathered. In the moment of catastrophe – which is the breakage – we must come to a resolution, the drive to create new skies, new clouds and new atmospheres, which will be developed on new planets.

6.1. *Etherospermia*

Paradoxically, a cloud is visually ephemeral but substantially enduring. Although a cloud is a collection of water vapor and dust in our sky, we see it as a mass, moving freely and without restraint. It is this phenomenon that makes Michaloudis' *Bottled Sky* (Fig. 11) particularly striking, because it appears to have captured not only a sky-fragment, but also a cloud.

The sky rests inside the vessel, like the water within a jug. The water fills the empty void of the vessel. It is in the state where it can be perceived as water, yet it is contained, it cannot flow. Images of water or clouds in the sky bring forth the ideas of movement, freedom and purity. These are qualities which are associated with the absence of control and restriction. If the vessel were empty of water, would it be considered empty? Surely it would still be filled with air (a substance more elusive than water), which can be described as a kind of invisible fluid.

Much like air fills the empty vessel, light fills the cloudless sky. 'Seeing light is a metaphor for seeing the invisible in the visible, or seeing things in an intelligible form that holds all that exists together but is itself devoid of sensible qualities' ([9, p. 3]). 'Silence', 'air', 'light' and 'atmosphere' are terms given to invisible elements which

always surround us. It is not that they do not exist; rather, they linger as imagined realities.

The possibilities of Michaloudis' artistic practice are greatly enhanced by an ability to experiment with the ethereal qualities of silica aerogel. *Bottled Sky* shows a fragment of the sky captured inside a bottle. The bottle contains a solitary feather cloud that hauntingly floats within the solid sky; the bottle veils the fragmented sky. It is a gentle, unobtrusive way to present sky as it appears to be preserved. Yet it is not. Its angelic presence masks the reality that the sky is breaking into fragments.

The Free-dimensional space described previously is also suggested through the artwork (*L*)imited Sky (Fig. 12). The use of containment is less visually obstructive in *Bottled Sky* than in (*L*)imited Sky, where the sky is caged. The metallic structure obstructs the sky; it restricts its existence. The boundary of the cage has been created by humankind, and undermines the balance of the environment. It is not only the atmosphere that is trapped within the cage, but our balance of existence also comes into question: if we cannot live on Earth, where can we?

The release of the 'seeds of sky' – *etherospermia* – must comply with the parameters for releasing objects into Earth's orbit and beyond into space. It is required that any small-sized object must have an anti-orbiting device that takes it out of orbit in less than 25 years. If the 'seeds' were to be released from the International Space Station then it must be considered that they may not reach a point where they escape orbit. Although small in size (and therefore perhaps not requiring an anti-orbiting mechanism) the release of the sky/cloud seeds must follow protocol.

Advanced technology and scientific collaborations are indispensable tools for the realization of the *Etherospermia* project. However, it is important to recognize that the driving force of this project is not, primarily, scientific interest. As discussed earlier, it is the common allegorical



Fig. 12. (*L*)imited Sky. Four litres of broken pieces-spores of silica aerogel, birdcage, white LED, 40 × 40 × 25 cm³. Photograph and ©Michaloudis 2008, Greece.

modalities of both science and art which are under exploration. Every scientist is also an artist who looks on the world with the eyes of a child. Human existence is impermanent. Our atmosphere acts as a veil; it contains and protects our existence. What we perceive to be the sky in *Bottled Sky*, becomes a visual insulation of the boundaries of the bottle – or, of our atmosphere. Can we see the process of catastrophe as the basis for new creation? Could we use the broken sky of the (*L*)imited Sky to seed future atmospheres on other planets? Could (*A*)ether, father of sky, become the future of humanity?

The sky becomes displaced, disrupted from what we know. The sky dissolves into the outer space, to the ether of the unknown, unprotected by any bottle or glass dome. Our atmosphere and our existence are as subtly related as in Michaloudis' bottle of sky: both container and contained. If the atmosphere becomes ruptured, what is to become of humankind? We, the cloud, are merely a transient plane of existence contained within the atmosphere. Once the atmosphere is breached, we are exposed.

The final artwork discussed in this paper is entitled (*M*) other Earth (Fig. 13). It contrasts the enduring significance we place on 'the world', with the impermanence of our existence. Considering the age of the earth, our existence is a mere speck in the expanse of time. Despite this seeming insignificance, and although our existence on this planet is fleeting, it is only possible under the protective veil of the atmosphere.

One possible response to this destruction of the atmosphere is through the *poiesis* of new atmospheric domes.

Here, the term *poiesis* is given its widest semantic latitude, as both 'poetry' and 'creation'. In Plato's *The Symposium* (205c), Diotima explains how *poiesis* entails bringing into being that which has not previously existed ([6, p. 42]). In this sense, *logos spermatikos* and *etherspermia* are combined through the allegory of (*M*)other Earth, and this act of *poiesis* is seen as linking human procreation, the creation of material form and the creation of knowledge.

7. Conclusion

Over the past twelve years, Michaloudis has experimented with silica aerogel as a sculptural medium. Although originally designed as a space technology material to capture stardust and act as an insulator, the artist has resituated this material in practice which is allegorical of the creation of sky, clouds and ether.

The *Etherspermia* project represents a provocative allegorical response to the grave ecological problem of atmospheric destruction. It allows for the possibility of transforming our broken atmosphere and projecting it, as a seed of hope, into the ethereal realms.

Humankind has evolved from the notion of *panspermia* to further advance its existence. Based on the assumption that life originates in spores and bacteria borne of elemental fragments, the project releases 'seeds of sky' into space, with the aim of preserving the Being of humankind. As such, this paper represents an important step in what the authors anticipate will be a growing collaboration between scientists and artists in the creation of new (*M*) other Earth(s).

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Fig. 13. (*M*)other Earth [detail], silica aerogel, golden leaf, stainless steel, $50 \times 10 \times 3 \text{ cm}^3$. Photograph and ©Michaloudis 2008, Greece.

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