

## **SPACE ARTISTS: Industry Creatives, Cultural Change Agents, Mission Specialists**

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### **Abstract**

The role of Space Artists in the current Space Renaissance has expanded significantly over time and now takes the form of becoming creative across adjacent disciplines, agents of change within diverse socio/economic/cultural value systems, flying on space missions as specialists, and integral in establishing civilizations on other worlds.

Western philosophers have long believed that humankind's ability to secure its survival and the advancement of its civilization is based on their innate instincts of reason, common sense, and the will to live. In the late 1940's Nobel Peace Prize recipient Dr. Ralph Bunche recognized that all three of these instincts are precipitated from the creative capacity of human beings. Extrapolated further, this creative ability is an imperative for civilizations to survive and advance.

While the innate creativity of human beings is an imperative for civilization to move forward, an imperative takes on a second significance for artists whose overarching instinct to create is an imperative in and of itself. Therefore, space artists are uniquely placed to offer assistance to their peers in manifesting creativity across multiple disciplines and, of special interest for this paper, to space scientists.

Ever more progressively in the 20th century, the creative processes and skills involved in producing art have been identified as elements that can enhance scientific innovation. This rather surprising revelation has placed space artists into the limelight as never before. And they have stepped up to the plate by engaging in interdisciplinary collaborations as experts utilizing creativity and imagination to innovate and problem solve, both of which are critical to the ongoing success of space science.

Interdisciplinary collaborations are considered by many thought leaders as the way forward in global affairs. Additionally, multi-disciplinary and cross over skills have engendered an entire new class of polymathic creatives, invigorated by a STEAM background, as they approach the challenges of Space 4.0.

This paper recommends nurturing the imperative to create and exploiting the creative imperative by further developing the space arts and space sciences as agents of change in civilizations. Artists are capable of fusing their particular skill set as no one else can, to help design for and interpret for a world whose survival is ever more dependent on space-based applications.

In essence, a matrix of artistic and scientific phenomena have merged in the 21<sup>st</sup> century to nurture a Space Renaissance. This renaissance of artistic innovation, polymathic ability, a disruptive NewSpace movement, an inclusionary and robust social agenda, an intergenerational STEAM educated workforce, artists embedded as science researchers, and direction from the UN's Sustainable Development Goals, have laid the groundwork for the next evolution of human's sustainable foray to the Moon, Mars and beyond.

# Space Artists: Industry Creatives, Cultural Change Agents, Space Mission Specialists

## 1.0 INTRODUCTION

*Space Artists: Industry Creatives, Cultural Change Agents and Space Mission Specialists.* The space arena globally is undergoing a period of major transformation, of a Renaissance, with the advent of Space 4.0 and the emergence of the NewSpace movement. This movement has greatly increased the numbers of the civilian population who participate in space activity and has forever altered the legacy of education and philanthropic giving.

The immediacy of space exploration and colonization has necessitated an analysis of how the artistic process that begets innovation can be utilized as a design strategy to propel and maintain a facility in space. This emergent circumstance creates a unique opportunity to usher in wider socio/space agendas, to focus on societal inclusion, and environmental concerns that anchor cultural sustainability in space. Through the leveraging of the media platforms, space art and space science have become two of the most well-known and inspirational disciplines in modern life.

As their ability to impact society has grown proportionately, so has their cultural status as Influencers or Agents of Change. With the reality of frequent flights into space, and the spawning of off-world civilizations, space artists can no longer sit on the side-lines of space science documenting events as they emerge, or imagining what might be found in space. Artists can only augment their knowledge and meet their obligations as cultural influencers by working from space.

The significant civilian influence in the space industry affords artists the opportunity to come to the forefront and join the ranks as Space Mission Specialists. Perhaps the most crucial service space artists can render in the age of space colonization is providing cultural and technical sustainability through the inspiration of their art, their dynamic interface with space science in terms of artistic process, their continued championing of an equitable cultural agenda and through their input into space mission planning and design.

All admirable and timely endeavours toward a lofty universal goal. The question is, then, how are the sustainers sustained? How is a career in the arts made self-sustainable by the civilization it serves?

## 2.0 ARTISTS AS INDUSTRY CREATIVES

In the 21<sup>st</sup> century the word 'creative' has morphed from a complimentary adjective into a noun with considerable gravitas. With the progress of space technology, the process of creativity has been restyled from a flattering description into a force of nature. This transition is not just a subtle linguistic tweak. Conceptually, it represents a major transformation affecting the advocacy efforts of space artists, engineers and scientists to maintain exploration, research and development for the benefit of the public at large.

### 2.1 From Cave Arts to the Space Age

As demonstrated by the earliest evidence on cave walls that depict celestial events over one hundred thousand years ago, to art that has been placed on the Moon, Mars or in orbit recently, artists strive to formulate that which they can see, and that which they can only imagine. It is well documented how art about space has deeply influenced many scientists, engineers, writers, filmmakers and artists of yesteryear, those in the present and very likely those of the future. Professor Roger Malina, physicist, astronomer and executive editor of Art/Sci/Tech journal *Leonardo*, makes the case that cave space artists and those who followed, kept a primordial vision of space travel alive until the requisite space age technology could be invented.

*"The space age was possible because for centuries the cultural imagination was fed by artists, writers and musicians who dreamed of human activities in space. Now with the end of the cold war the role of artists and writers is again crucial in defining our future vision of space and will once again be instrumental in incorporating the facts and discoveries of the space age into the cultural imagination." (Malina,2013.)*



Figure 1. Homage to Classic science Fiction by William K. Hartmann, (Hartmann 2002)

Courtesy of the Artist.

In his Homage to Classic Science Fiction of the 1950's, William K. Hartmann salutes the pioneers whose paintings were used in publications (Hartmann and Sokolov, 1990). The massive amounts of artwork produced over the years serve as evidence of the need for illustrated comics, magazines and books since Jules Verne's first sci-fi publication in 1865. Movies and posters also provided artists with platforms to show their work, to the delight of those who went to the cinema, read books, saw television and waited for technology to synch up with science fiction. Following on from the space art of the past, and coming into favor just after the devastation of World War II, images like Hartmann's from around the globe served as a focal point for a future worth the struggle to achieve.

## 2.2 The Phenomenon of Creativity: coloring outside the lines

An act of creation is taking an idea through to fruition by using a variety of processes to come up with a product that is greater than the sum of its parts. It is being able to apply an open mindset to new thinking processes, of seeing beyond the obvious, of coloring outside the lines and thinking outside of the box. Being a 'Creative' is a requirement for many a new position in and outside of the space industry. Being part of a creative team is also an ideal platform for stimulating trans-disciplinary collaborations. This applies to local, national and international teams as well, a unifying position from which to cooperate without requiring restrictive political oversight.

The phenomenon of creativity has been widely acknowledged as the basis of innovation, and constant innovation is the main component that underpins culture, commerce, science, education and technology. Thus, creativity and innovation have become widely sought-after commodities that support a sustainable future. Space artists, who instinctively react to an innate imperative to create and focus on space as a subject, are uniquely placed to offer assistance to their peers in manifesting creativity across multiple disciplines.

Artists accepted the challenge by engaging in interdisciplinary collaboration utilizing their imagination and instinct to innovate and problem solve. As the space science disciplines have dramatically broadened in scope with the inclusion of the commercial and civilian sector, constant innovation is critical to their ongoing progress.

Creativity, then, becomes a commodity that must be sustained. Fortunately for Earth's humanity, creativity, alongside its component of curiosity, is a naturally occurring human imperative. As proven generation after generation through the millennia, creativity is an embedded resource, it is self-sustaining and thus, will never be in short supply. One of the most essential functions of 21<sup>st</sup> century space art is to use that resource to provide leadership and collaborative support in the advocacy for social change and the advancement of space science for the betterment of human kind, a role that befits their inimitable talents.

### 2.3 A Renaissance of Polymathy

The polymaths (those who are trained in two or more diverse disciplines) of the West's Renaissance (14<sup>th</sup> to 17<sup>th</sup> centuries) who promoted the rediscovery of classical philosophy, literature and art, were products of a particular age when learning was a mark of distinction because only a few could afford such a luxury. However, the enthusiasm for their subjects, the heated debates, that they could publish philosophic and scientific concepts and maintain libraries for the first time in history, all served as keystone events that accelerated the speed of the scientific revolution.

Then as now, the true value of a polymath's wide array of interdisciplinary knowledge is their ability to interconnect and integrate one subject into another. Although the era that spawned the first Renaissance person has passed, the idea of the polymath as one who is capable of developing advanced ability in divergent multiple disciplines, has not (Friedman, 2018).

Today the definition of a polymath varies in scope and degree within the context of the era in which the polymath lived or lives. With the onslaught a vast amount of technology, the curiosity and creativity of the polymathic individual did not go out of fashion as much as it gradually transformed into a polymathy of degree and scope, as the needs of a technological society dictated.

Roger Malina recognized the polymathic abilities and the role they played during the development of the space age. Roger refers to polymaths as today's "hybrids" (those who have dual careers in the arts and sciences). Although they were few and far between at the beginning of the Space Age, today is a different story. They are spread among the fields of science and engineering in universities and industry, and have, indeed, become a phenomenon.

Those artists and scientists who, by virtue of the industries' overarching demand that creativity be in service to innovation, have emerged in a pivotal new role as 'Translators' for different knowledge sets. Malina describes an entirely new class of professionals: those who are mobile and navigate in transdisciplinary practices (Malina, 2013). Whether it be called interdisciplinary, cross disciplinary (adjective: relating to more than one branch of knowledge) trans-disciplinary (noun: relating to more than one branch of knowledge) The polymathic interdisciplinary ability is at the core of innovation because the facility they possess to amalgamate elements previously not considered as related, can be brought to bear on a design problem or an invention.

Author and academic Michael Araki recognizes the need to analyze the nature of each component of polymathy to determine how to best systematize the phenomenon to give rise to generalizable findings. In this era of fragmented knowledge (inherited from the age of industrialization) the end goal is to create synergies between disciplines where none existed at the intersection of multiple domains and between different bodies of knowledge. Thus, the ability to recombine and synthesize knowledge so that it can be applied to a problem at hand is the core value of a polymath (Araki, 2018).

In *The Polymath, Unlocking the Power of the Human Versatility*, Waqas Ahmed reveals that polymaths were some of the most influential figures in world history, and instrumental in shaping the modern world. To take advantage of this polymathic propensity, Ahmed envisions a cognitive and cultural revolution to educate a new generation of polymathic minds to take stewardship of the future, thereby engendering a highly motivated, well equipped society to address the complexity of the 21 century challenges (Ahmed, 2018). Being a polymath is more than just having two or more interests in vocational and avocational activities. Rather, it is an automatic transference between those two mindsets. Araki perceives polymathy at its best, reflecting back to the original moral and social responsibility that the privilege of knowledge evoked in the polymaths of yesteryear's Renaissance. (Araki, 2018)

### 3.0 THE ARTIST AS CHANGE AGENT

#### 3.1 The Popularization of Collaboration

The subjects of creativity, polymathic ability, trans-disciplinary and ArtScience collaboration have become very popular topics that have increasingly been the subject of academic papers, books, on the lecture circuit and online. The commonality of polymathic ability between artscience practitioners is being analyzed by academicians. Space industry entities have noted the success of artists as space researchers, and conversely, scientists succeeding in their attempts to employ an artistic approach as a design strategy. Thought leaders have expressed faith in collaboration as the way forward in the global affairs of space.

The interaction between the space art and science disciplines in the Space Age has demanded a progressively more complex inter-relationship. A new dimension for the artist as space researcher and lead provocateur integrating space science as part of the day-to-day cultural discourse. For engineers and scientists, the suggestion is to expand their mental agility by employing an artful approach to their work as a design enhancing strategy to solve the most urgent threats from space.

For example, one of the most worrisome problems facing humanity is that of space debris cluttering orbits. While many scientists and researchers the world over have been and continue to tackle this clear and present danger, To manifest the feeling of how imminent that threat is to the public, a painting by the author illustrates the mass of debris in space, threatened with the deadly havoc it could reap. The shiny, sparkling, satellites indicate human attraction to and dependence upon their applications. The crowded domain indicates too, the certainty of impending disaster. Meanwhile, lurking just behind the attraction is a background of gloom and doom, representing the chaos, the horror of the loss of lives, property or life-saving services after a collision. No doubt this situation keeps many in the space industry up at night.



Figure 2. Barbara Amelia King, *Shiny Satellites and Certain Catastrophe*. 2021

Digital treatment of original photography. Courtesy of the artist.

One significant collaboration between the two disciplines is that of artists using space data to create another dimension to the information about space. Space artists invigorate space science by contextualizing data for the consumption of the general public, investors, entrepreneurs, and educators at all levels. It is the artist's ability to transform data into images that provides another layer of substance to the space data collected. They provide the hidden link between the downloading of raw data and its dissemination into practical, on the ground utilization.

Although cameras capture photographic and film images progressively more accurately than in the past, an artistic eye must be employed to contextualize the images and present data graphically in such a way they can be fully comprehended and appreciated by both a scientific and on non-scientific audience. Also, artists take over where the cameras leave off to present imagery which has not yet been seen or may never be seen by the human eye, translate words and numbers in images, illustrate stories explain complex ideas and offer concrete examples of why the data was gathered in the first place.

These are scientific functions in which artists excel. Space artists consult with astronauts, scientists, mission designers, and other experts to design their art, and avail themselves to all materials available from the largesse of space science research. Artists have become interested in artfully display that information, both for aesthetic appeal, education purposes, and cultural memory. (King, 2020).

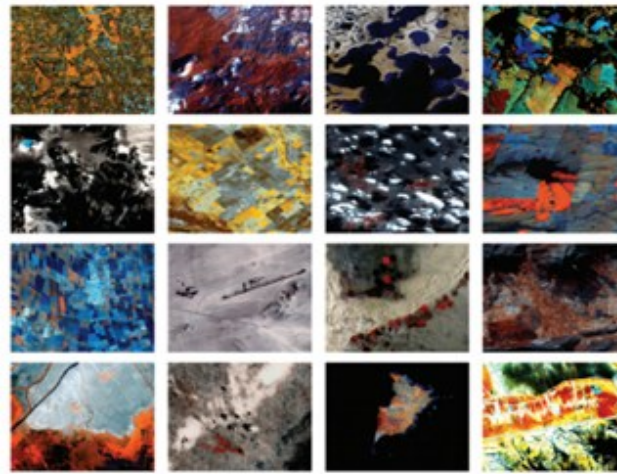


Figure 3. Marcus Neustetter. *SumbandilaSat's Final Messages*, Print on paper 2012. Courtesy of the artist.

An example of making data attractive to the public is the work of South African Marcus Neustetter. This image portrays the last images sent by South Africa's historic SumbandilaSat before a solar storm stopped its transmission in June, 2011. Literally using its last images, and deftly applying colour, form and spacing, the artist evokes the sentimentality from the images in character with what the satellite meant to its South African population.

Perhaps It may not be considered scientific to develop an emotion about inanimate objects, however, emotions create a sense of personal attachment to the results, and of appreciation for the team collaboration that went into the manifestation of the object. Industry personnel know very well what accomplishments the application of what they are doing are. It is the artists job to use their persuasive power to bring that appreciation of their accomplishments to the public.

## 3.2. NewSpace Philosophy & Philanthropy

### 3.2.1 Philosophy

The evolution of the Humanities (the subjects of Art, Literature, Music, Philosophy) which once encompassed both the arts and sciences until science branched out on its own, was predicated on a curiosity about the natural world, and a thirst for knowledge available through observation. During the European Renaissance of the 14-16<sup>th</sup> century polymaths were able to expand the standard of scholarship by achieving mastery in intellectual, artistic and physical pursuits that also embraced a concept of universality and humanity.

Because survival of civilization is an overarching concern for the current Space Renaissance, the Humanities are being brought to the table anew. Of special interest is the philosophy around which civilizations are designed according to the mores of the era. In comparison to the recent past, the development of civilization on earth or in space cannot be built on systems employing slavery, entrenching classism, or any of the 'isms' that create a 'have and have not' paradigm. Forward thinkers in both disciplines are aggressively pursuing the concept that no one be left behind in terms of education, career prospects or any one being able to serve humanity as scientist or artist, or both.

### 3.2.2 Philanthropy

Developments in the disciplines of art and education are often fast-tracked by philanthropic and corporate giving. Currently the direction of world philanthropy and institutional giving indicates that space/science, tech/education/art are at the top of the list of causes.

The new disruptive tech industries have revolutionized the space industry; and they have greatly impacted the philanthropic giving landscape as well. According to *Inside Philanthropy*, history is being made as the tech disruptors are dramatically changing the traditional pattern of giving, verified by the amount of current corporate donations exceeding those of individual philanthropists and traditional foundations together, and by a long way (Paynter, 2018).

Philanthropy is legacy driven, and often tackles global issues that blur the lines between institutional, special interest and charitable giving. A case in point are Silicon Valley tech/space billionaires, representing both individual and corporate funders, who favor causes that are often a natural extension of their field of expertise, and very close to their heart.

Such funders are impatient with the generally slow progress made from traditional philanthropic models and have changed the field forever by donating large amounts of funding for arts, education and technology to ensure their donations will make a permanent change to the status quo. They are adamant about accomplishing significant change within their lifetimes.

Disruptive technology's proclivity towards creativity, its need for innovation, and its desire to create the next generation of artists and scientists is the driving force for nurturing space artists, Art/Sci research and furthering STEAM (Science, Technology, Engineering, Art, Mathematics) education. Those industries have revolutionized the space industry by donating unprecedented billions and expecting results in their lifetime, thereby ensuring their own legacy by training their future workforce.

### **3.3 The Next Gen & STEAM**

To assist in advancing space science's lengthy inter-generational projects, in engineering space applications for society and to continue space exploration, The United Nations Education, Scientific and Cultural Organization (UNESCO), space agencies, and educational institutions globally collaborated to put into place an international educational curriculum to meet that demand in various countries around the world. Acknowledging the necessity of adding the A for Art/design to that equation in 2016 (thus the newer title STEAM) along with its global approach to sustainability, STEAM provided a heretofore untapped avenue to become the consummate platform to drive polymathic art and science crossover education.

Space institutions are also instituting equity for race, gender, geography and generation. Many are aggressively pursuing the concept that no one be left behind. Space science and the arts in particular have been levelling the playing field with diverse multi-cultural actors. (UNESCO, 2019). Space STEAM casts a wide net by partnering with other national departments, state agencies, and private and commercial institutes to leverage its assets such as the ISS and various space centers to conduct, and televise, Space STEM programming. (NASA, 2021).

### **3.4 The United Nation's Sustainable Development Goals**

The resurgence of a renaissance approach to space exploration along with the global interest in cultural equity dovetail with the UN's Sustainable Development Goals to exert significant influence going forward. This influence has never been more critical, or as probable to accomplish than today, as we stand on the precipice of game changing space science applications and colonization of other worlds.

In 2018 the United Nations' Committee on the Peaceful Uses of Outer Space (UNCOPUOS) declared the disciplines of space science to be a driver of global development and sustainability by applying its Earth observation, geospatial data, and hyperspectral imaging. This kind of innovative entrepreneurship has greatly lowered the barriers to participation in space for developed and developing nations by lowering prices and increasing the ability to launch payloads and retrieve targeted data. (King, 2020)

Supporting the Sustainable Development Goals ensures that the benefits of space applications continue to be exploited to their maximum. Sustainability also demands a robust social/cultural inclusion and strong environmental protection. That kind of inclusion, in turn, requires a platform designed to engineer and implement projects, create strong partnerships, obtain sufficient funding, and educate and build human capacity.

To build human capacity specifically for artists whose work includes space, the International Association of Astronomical Artists (IAAA) is a guild of space artists formed in 1983 by the artists on the production team of Carl Sagan's *COSMOS* film. The IAAA has developed a platform for its members, to exhibit in online galleries', expose the public to astronomical art, offer educational lectures from the members, and offer critiques. Now a non-profit entity, IAAA implements and participates in astronomical and space art projects to promote astronomical art and to foster international cooperation in artistic work inspired by the exploration of the Universe. The membership is aware of the need to keep continuity within space arts over the generations by providing assurance, instruction and resources.(IAAA, 2021)

New Space culture assists in levelling the playing field by extending access to space data for under-resourced and underdeveloped countries and by investing in STEAM education. Multi-disciplinary and cross over skills have engendered an entire new class of polymathic creatives, invigorated by a STEAM background, as they approach the challenges of Space 4.0. It was not only altruism that drove the educational revolution towards gender, race, class and geographic inclusion in the science and technology fields; rather, it was the realization that STEAM occupations drive economic growth and prosperity.

#### 4.0 ARTISTS AS SPACE MISSION SPECIALISTS

The author acknowledges the role of artists as ambassadors of space science, and advocates a new role, not just as artists chronicling the action from the side-lines, but as active participants as space mission specialists living on other worlds. This research also puts forth the notion that space art raises public awareness about the value of technological innovation, which subsequently inspires socio-political changes and improves living standards, because space art speculates about a future benefitting from space-based applications.



Figure 4. Barbara Amelia King. *African Artists as Mission Specialists in Situ*, digital painting 2021

Courtesy of the artist

There is hope on the immediate horizon for direct artistic participation in a lunar flyby. On 18 September 2018, Japanese art collector and entrepreneur Yusaku Maezawa, and Space X founder Elon Musk announced a mission designed to place artists in orbit around the moon (Dickson, 2018). Maezawa is a philanthropist who wants to drive humanity forward by offering the inspiration from the art produced on the trip and long afterwards. Perhaps as early as 2023, artists will take their place in the forefront of the space community by creating space-based art on location, in cislunar space.

Maezawa integrates the value of art to space science, and the value of space science to humanity, and envisions this trip as a universal art project that will contribute to world peace (Maezawa, 2018). Although they may be currently referred to as "tourists", however these artists, as they are there for a purpose, doing a function that only someone with their skill sets can accomplish.

Now that that work for the Lunar Gateway is well under construction and hoping to launch in 2024, one might reasonably expect artists to also be among the personnel chosen for involvement in the space mission and design as well as being earmarked for participation in situ.



## 5.0 CONCLUSION: WHAT SUSTAINS THE ART AND THE ARTIST?

The major outcome of this research indicates that the social/technological import of space art and space science becoming agents of change does have significant influence going forward in the next evolution of the space industry. Creativity, imagination and innovation have become an essential element in the development of the space industry's processes and products, hopes and dreams. The space industry has opened a remarkable new dimension for space art by providing the commercial momentum necessary for space science and space artists to boldly go.

Why, then, do most artists as producers of much of the inspiration and methodology behind the creativity/innovation/socio/environmental sustainability platform find themselves in a financial position that is both unstable and unsustainable? it is commonly acknowledged across many generations that there are only a limited number artists, let alone of space artists, who have gained fame, and fewer yet economic sustainability.

How will artists be able to enrich their lives, the lives of their peers, and provide an unbroken continuation of talent throughout further generations if artists is not equitably compensated for the value of their art to society? In the Western culture, throughout the ages, the choice of artist as a career has never been one without economic uncertainty. There would be so many millions more artists and artworks had economics not played a role in their career choice.

However, today with the momentum of the Newspace culture the Space Renaissance, space artists are among those who cannot be left behind. Their status in society must be leveraged by the momentum of Space 4.0 to befit their new roles in transforming space culture by being creatives, change agents and mission specialists. The same with their skills of polymathic enquiry, becoming part and parcel of STEAM education, and other collaborative engagements with the space industry.

Amid the larger economic aspects, smaller cultural omissions must also be corrected, For example, artists work often goes unsigned when it is on public display. On so many web- sites, power point presentations, printed material and videos, the visual artist, illustrator, or graphic artist's name is not directly attached to their artwork. How many times have we seen 'An artist's depiction' instead of the artist's name? Unfortunately, this is a common occurrence which needs to be corrected to be inclusive.

Imagine a scientist publishing a paper without their name being included prominently, but rather, somewhere in the credit listing or not listed at all. It wouldn't happen. After all, the Theory of Relativity is known as "Einstein's" Theory of Relativity, not "A Scientist's Depiction" of the Theory of Relativity. To subsume the artist's name within the entity that funds the product may be common practice, but it is definitely not best practice in the eyes of this author. It is; however, an indication of how little attention is paid to the value of the arts.

The direct connection between creativity, innovation and socio/economic sustainability has now been verified by many, in many fields, for many years. This evidence, combined with the unparalleled vivacity of the disruptive space industry with its explosive drive towards space exploration, ushers in a unique opportunity to correct the economic status of the arts.

Perhaps the enthusiasm for art/sci polymathic collaboration and the economic value it promulgates will provide the impetus for artists to leverage their skills into an economic bracket that is commiserate with its value. Perhaps practicing art can become a sustainable, worthwhile calling in society here on Earth and in the space civilizations yet to come, as depicted by artist Forest Stearns' futuristic vision of an artist at work.



Figure 5. . Forest Stearns, *Artist in Situ Off-Earth*, 2002. Ink on paper. Courtesy of the artist

## ACRONYMS

IAAA	International Association of Astronautical Artists
STEM	Science, Technology, Engineering, Mathematics
STEAM	Science, Technology, Engineering, Art, Mathematics
UN	United Nations
UNESCO	United Nations Educational, Scientific, and Cultural Organization
NASA	National Aeronautics and Space Administration
SDG	Sustainable Development Goals
WW II	World War II

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