CREATIVE RESISTANCE AND SATELLITE IMAGINARIES

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The paper explores two critiques of the purpose of space technology in the formational, early years that shifted the imaginary of space technology away from the conquest of space towards the uses of orbiting satellites for Earth. Resistance to the competitive exploration activities of the Soviet Union and United States and their increasing technological advantage emerged from various countries around the world during the 1970s. Two of these resistant moves are presented in this paper as creative and innovative critiques which reinterpret the design and purpose of new satellite technologies in different ways. The first is a UN Treaty signed in 1976 by eight Equatorial countries claiming sovereignty over the geostationary orbit. The second is the Indian space programme's Satellite Instructional Television Experiment that took place from August 1975 to August 1976 and was an experiment in combining space technology with television to bring health and farming information to villages deemed most in need and most distant from the emerging concept of the Global Village. Both have been the stimulus for long-term art projects I have developed in collaboration with others. In hindsight, one of the reasons we embarked on these projects was an identification with the subaltern position each expose in the determination of space technology. Another was out identification as artists with the spirit of creative resistance inherent in each. The paper outlines the creative innovation and critique of each example and then gives a brief overview of the artworks they inspired.

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The Declaration of the First Meeting of the Equatorial Nations adopted on 3rd December 1976 defines the geostationary orbit[1] as a limited natural resource under the sovereignty of Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda and Zaire.[2] Known also as

[1] The geostationary orbit is a circular orbit 37 000 kilometres above the Equator. At this height and position a satellite can orbit, staying above exactly the same location on the Earth. At this orbit the satellite is said to be 'synchronous' with the Earth's orbit so the orbit is referred to also as the geosynchronous orbit. Arthur C. Clarke is often credited with 'inventing' the orbit, so it is sometimes referred to as 'the Clarke Orbit' with reference to an article Clarke wrote in 1945 stating that in this orbit, three satellites could survey the whole earth at once (Wireless World, 1945) Clarke writes, "A single station could only provide coverage for half the globe and for a world service three would be required, though more could be readily utilised". Henry Potocnik and Konstantin Tsiolkovskii are also credited with this idea. Satellites in this orbit form a circle and have to be specific distances apart, not only so they do not crash, but also so that their frequencies do not interfere with each other. For this reason there is a limited amount of

The Bogotá Declaration the text is an eloquent statement of the emerging inequity caused by the technological advantage of nations with satellites in the geostationary orbit. The language in this official text conveys a seething anger targeted at the "industrialised countries" that continued to shape the rules to their own advantage, even in outer space:

> "The solutions proposed by the International Telecommunications Union and the relevant documents that attempt to achieve a better use of the geostationary orbit that shall prevent its imminent saturation, are at present impracticable and unfair and would considerably increase the exploitation costs of this resource especially for developing countries that do not have equal technological and financial resources as compared to industrialized countries, who enjoy an apparent monopoly in the exploitation and use of its geostationary synchronous orbit".
> (The Bogotá Declaration, 1976, Article 1)

Here the signatories accuse the regulatory body for the geostationary orbit, the International Telecommunications Union, of unfairness in their allocation of slots in the geostationary orbit, so-called because satellites orbiting at a height of 37,000 kilometers above the Equator synchronise with the Earth's orbit and the satellite appears to remain stationary. Frequently, in space law, this document is interpreted as a misguided and overstated claim for sovereignty (Lyall & Larsen, 2009). What is missed, by interpreting the document in that way, is that the Declaration is evidence of something more phenomenological than legal, that it points to the phenomenon of having and not having a satellite and how that feels. It points to the affective space of space technology production.

The claim of sovereignty is in essence a rhetorical stance. The real purpose of the document is performative. The fullest meaning of the document is not to be found in the legal reading of the text, but through an appreciation of the experiences that gave rise to its claim and language. The treaty is an opportunity to make the consequences of not having satellites palpable, within a limited spectrum of possible moves. The existence of the treaty and its rhetorical resonance poses questions as to the nature of the affective

space in this orbit, which is how it came to be declared a limited natural resource in the treaty. The International Telecommunications Union has the responsibility of assigning orbits.

domain of space technology: the satellite footprint's indirect consequences and what it is that the experience of having or not having a satellite translates into. The Bogotá Declaration provides evidence that

2 The full text of the treaty can be found at http://www.jaxa.jp/library/space_law/chapter_2/2-2-1-2_e.html (Accessed on 10 June 2018).

as the nations able to launch satellites did so, they correspondingly affected the status of those nations not launching satellites. Without satellites in geostationary orbit the eight Equatorial nations perform through the text the otherwise invisible effects brought to their nations by the launching of satellites by other nations.

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An equally compelling critique of the problem of ownership and application of satellite technology is found in the formational projects of the Indian space programme. Between July 1975 and August 1976 the Indian space agency conducted the largest experiment anywhere in the world in using space technology for the least advantaged. The Indian Space Research Organisation (ISRO) addressed the emerging inequity of spaceflight by proactively designing an alternative model of spacefaring that foregrounded the needs of the non-elite, rural populations of India. The project was called the Satellite Instructional Television Experiment, or SITE. The Indian space programme has received attention for its distinctive societal emphasis (Sheehan, 2007; Harvey, 2000), but it is rarely framed in terms of a resistant act or critique of the inequitable shaping of space technology during its first decades, nor as creative reinterpretation of a large-scale technology. Accounting for the ideological shaping of ISRO's programme in this way exposes the creative re-engineering of India's subaltern position from a minor spacefaring nation, to an imaginative, innovative and ethically motivated spacefaring nation.

The tactic mirrors the broader trajectory of India's international relations at the time as it took the moral high ground as a non-aligned state in the Cold War. Prior to the establishment of its space programme, India had, through the 1950's, defined its own distinctive position internationally through 'moral leadership' and a political 'third way'. In Prime Minister Jawaharlal Nehru's visits to the United States and the Soviet Union he resisted the intense pressure put on him to align with one or the other, much to the annoyance of the US Administration as evidenced in documents from the time (Guha, 2007, pp. 155-167). This independence of spirit is reflected in the kind of space programme adopted by India, which moved into an alternative, unoccupied ideological space: A

societal space programme directed at enhancing the livelihood of its population, as distinct from a programme motivated by politics, power or the military aims of the Cold War. The establishment of a societal space programme by India was nonetheless deeply political in that this assertion of a third way, of neutrality, of opting out of the US-USSR binary was far from neutral. The US administration saw India's neutrality as threatening to its own alliance of support. The historian Ramachandra Guha writes, "Nehru at first tried hard to avoid taking sides in the Cold War.

But, as he often said, this non-alignment was not mere evasion; it had a positive charge to it.

A third bloc might come to act as a salutary moderating effect on the hubris of the superpowers." (Guha, 2007, p. 164). Nehru's neutrality was not an opt out, it was a strong stance and one that was difficult to maintain in the face of the pressure from the United States to choose sides.

Understanding this background helps to put the establishment of a space programme in India in 1962, and its philosophical journey, into some perspective. Its founder Vikram Sarabhai gave a speech in 1966 clearly referring to the space programme's 'non-alignment with the race to the Moon, saying, "man will surely push ahead with adventures of this type backed by motives which will inevitably be mixed" (Sarabhai, 1966, 2001, p. 92). Put within the context of 'neutrality' and 'non-alignment' as a highly political and far from neutral third-way, the societal programme takes shape as a bold move and an act of resistance, on the one hand against the pressure to choose between sides, and on the other hand, as a positive act in exercising the freedom to create a new imaginary of spacefaring. Perhaps also for Sarabhai, who had been active in the cooperative and disciplinary-led International Geophysical Year in 1957, the socialist ideology adopted for the space programme was also a protest against the co-option of scientific instrumentation for political gain. As noted by a later ISRO leader, "it is significant to note that the early inspiration for the Indian Space Programme came not from any military objectives, but from the interests of a large scientific community who have been actively engaged in research programmes related to geophysics and astrophysics" (Kasturirangan and Rajani, 2007, p. 1645). In claiming a socialist agenda and societal remit the founding character of the Indian space programme was symptomatic of the deep flaws in the claim that spacefaring could be an activity carried out on behalf of all humankind. Instead of the idea of humanity, the Indian space programme invoked the 'societal' as a more nuanced concept that could be practically addressed.

The television experiment SITE was a demonstration of how India could invert the logic of political and economic elitism that seemed to characterise space technology by creating new rules of engagement that favoured the non-elite. In other words India constructed a space technology based on the determining needs of the technologically disadvantaged, the hitherto subalterns of spacefaring. The rooted morality of India's invocation of its people and the Earth through its space programme, by dint, exposed and devalued the belligerent aims of the Space Race in an act of resistance favouring those perennially disenfranchised by the preoccupations of spacefaring.

Like the Bogotá Declaration, SITE brought a new dimension to spacefaring imaginaries. Instead of invoking futuristic imaginaries such as space colonisation, silver-suits and epic spaceship voyages, both acts of subterfuge brought new sets of imagery and new geographies of space technology to mind. Unlike the text of the treaty, India conveyed little adversary towards the superpowers maintaining the collaborative culture of the international science community and working with NASA on its national broadcasting experiment. Nonetheless, India drew soft power from the initiative's creative reimagining of space technology and through its collaboration with the United States appeared benign and forestalled failure.

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My forays as an artist have been to turn these interventions that attempted to reimagine the culture of orbital space into tangible and shareable ideas: To open up again the current trajectories of spacefaring programmes for critique, modification, interpretation and creative resistance. With Alejo Duque, an artist from Colombia, we have performed The Bogota Declaration as a poetic remix and created public installations of the history of the geostationary orbit. The images below are from an installation created in Bengaluru, India.

Each revisiting of the Declaration pulls back into the present the relation of the Equator and Equatorial countries to technology. These are acts of making and improvising that bring to mind historical repositories of the affective, emotional consequences of space technology. The Bogota Declaration remains unratified and the installation, which colour codes satellites belonging to Equatorial nations, confirms the small number presently in geostationary orbit.

In India, I mentored a two-year interaction with scientists from the Chandrayaan Moon mission called Moon Vehicle that gently explored the societal remit of the space programme in the light of its Moon mission. The images give a glimpse of some of the events and interactions, which I have also written about elsewhere (Griffin, 2010; 2015).

A number of Moon Vehicle workshops were held at schools with middle-school children (around the age of twelve) as creative learning projects with design students from Srishti Institute of Art, Design and Technology facilitating. These also involved scientists from the Indian Space Research Organisation (ISRO) and the Indian Institute of Astrophysics (IAA). As such, the workshops were vehicles to bridge neighbouring communities. One of these took place with children from Drishya Learning Centre a school located in an urban slum close to the ISRO.

The workshop was an intensive two-week 'summer school' and one of a number of workshops led by artists that were intended to give the children a different kind of exposure to the world around them through creative, experiential engagements. In the first week of the Moon Vehicle summer school two visits were made to ISRO. The first was to the ISRO Satellite Application Centre where Chandrayaan had been assembled and the second to the ISRO Indian Deep Space Network (ISDN) 30 km south of Bengaluru where the huge tracking antennas were located and images from the Moon's surface streamed from the spacecraft each day. In between and in response to these activities the children

discussed what they had seen in the context of scientific and non-scientific ways of knowing the Moon, adding their own invented mythologies and questions. They developed highly creative portfolios of drawings, fabricated their own spacecraft and every morning worked with a dancer, Anitha Santhanam, to develop performances based on their interactions with space technology and technologists. At the end of the two week workshop the children presented their performances and creative work to an audience of other Drishya children and facilitators together with scientists from ISRO and the Indian Institute of Astrophysics.

In this important process of sociability across disciplinary domains, social divides and generations, the ineluctable accomplishment and ingenuity of the visual artefacts and performances produced by the children called attention to their interpretive and generative abilities that took the participant astronomers and space scientists by surprise. The expectation that the scientists would teach the children was inverted to some extent and instead the children's creative work effectively explained back to the scientists the inventive and critical meanings the children developed themselves, through their creative transformations. The workshop emphasised ways that transformative creative processes established the value of the children's own experiences and viewpoints and in so doing appropriated space technology and its rituals of reception.

This appropriation had many facets and was a constant and iterative aspect of the workshop. After their visit to the clean room where satellites were assembled, which they observed from behind glass, the children began to build their own versions of spacecraft and, dressed as ISRO technicians, to some extent usurped the technician's role and accessed imaginatively the inaccessible zone of the clean room. Through their creative work the children further deconstructed the restrictions and social hierarchies which they had observed and been subjected to. Spacecraft and rockets with white coats and button down shirts appeared among their creations as well as drawings of military security guards ordering the children not to bring cameras, mobile phones or USB sticks appeared in their portfolios and performances. The creative work negotiated a position of agency for the children, which in some sense was fleeting in that it was reliant on the context of the workshop. It was an agency that arguably brought no determining influence on space technology. Yet, the performances and creative artefacts presented a space of interpretation in which the children re-ordered ISRO's space technology into schemes of their own devising.

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This brief paper draws comparison between the policy-level interventions of nations selfidentifying as subalterns to the grand narrative of space exploration and the critical-creative activities which I have been involved in devising as an artist – identifying also as a subaltern to space industry projects which claim to act for my benefit. The Space Race positioned the 1976 Bogotá Declaration and the 1975/6 Satellite Instructional Television Experiment as creative acts of resistance to the dominant shaping of the purpose of space technology by the United Sates and the Soviet Union. Each action re-imagined and inverted assumptions, one with text and the other with the actual and imagined image of residents in Indian villages connecting to the global village via orbiting satellites. The tactics are those of artists who habitually invoke the charged opportunism of the subaltern position to re-engineer imaginaries, opening the possibility that these imaginaries may become self-fulfilling prophecies.

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