Kul'tura Kosmosa:
The Russian Popular Culture of Space Exploration

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Abstract

This thesis argues that there is a popular culture of space exploration characteristic of a wider Russia; its roots lie in pagan times and it grew through Orthodox Christianity and Soviet Communism to the twenty-first century, where it is actively promoted by Russia and neighbouring nations.

The key influences stem from Nikolai Fedorov, Kontsantin Tsiolkovsky, Friedrich Tsander and Yuri Gagarin.

The narrative of the twentieth century Soviet space programme is considered from this perspective and the cultural importance of Tsiolkovsky to this programme is acknowledged. This is an alternative perspective to the commonly-held Western view of the "Space Race".

The manipulation of imagery and ritual of space exploration by Russia and other neighbouring nations is examined, and the effect on the "collective remembering" in modern Russia of key events in Russian space exploration is tested.

Acknowledgements

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Many institutions were particularly helpful. In Russia, the complex in Gagarin city initiated me into Gagarin's cosmos, and in Kaluga the Tsiolkovsky house museum granted me the same privilege with Konstantin Tsiolkovsky. In Ukraine the Kiev Polytechnic Institute, the Planetarium in Kharkiv and the Cosmonautics museum in Zhytomir were most accommodating and helpful. In Belarus the directors of the museums in Tomashenko and Krypki Minsk were patient and gave me insights I would otherwise have missed. In Germany, the Staatsarchiv in Chemnitz opened their files for me, and the Deutsche Raumfahrtausstellung in Morgenröthe-Rautenkranz was very illuminating. My thanks to you all.

John Heath, G7HIA, is an enthusiastic friend, companion, and fellow space pioneer.

Finally, my wife Jane, daughter Sophie, and sons James and Alexander tolerated and – I think - were sometimes intrigued by this endeavour.

Any omission or error is, of course, entirely my own responsibility.

Вперед, на Марс!

Andy Thomas
G0SFJ

CONTENTS

Chapter 1: Introduction: Russian popular cosmology and its influence on space exploration

When Western Europe and America confront the achievements of the 1960s in space exploration their talk is usually of a "Space Race" between the Soviet Union and the United States of America. But this thesis argues that space exploration in Russia is a cultural phenomenon that has roots in the very identity of *"Rus",* that Russian heartland of the forest, long before the Bolshevik revolution,

Westerners, who were not born into this environment, need to accept it as being unfamiliar, and use their alienation to analyse and describe this unique *"Kul'tura Kosmosa*" (Culture of the Cosmos). In this thesis, items of popular culture, and instruments of displaying it, are examined anew, arguing for the existence of a composite popular culture, as if the cultural items are the different facets of the same diamond. The study will concentrate on the present-day countries of Ukraine, Belarus and Russia, with excursions to other countries where justified by modern history.

Origins

In the Belarus village of Krypki, an hour and a half's drive from the capital, Minsk, the monument to Cosmonaut Kovalenok lies just across the road from the village museum. It is a handsome bust of a living legend, a man who left this village and went into the Cosmos; mounted in the Soviet style on red marble, it remains unspoilt, without graffiti, revered even, despite its proud announcement that in another time

and place he was twice anointed as a Hero of the Soviet Union, a union which no longer exists, to which this country, Belarus, no longer belongs.

But inside the museum he takes second place, together with the village's Olympic sportswoman, to a magnificent display of Belorussian embroidered *rushnik* or cloth[1]. These embroidered scarves portrayed over centuries the Russian experience of the Cosmos. They were a woman's sacred household possessions, hung together with a religious icon in a special corner illuminated by the sunrise from the East[2], in smallholdings and villages where the important things in life were the forest, the *sobornost* (community) and the sky. The peasant's icon represented a saint, a resurrected being, one who lived in the Cosmos, in the sky.

The Russian experience of space – the popular culture of space exploration – lies in a complex cosmology that is fundamentally different from Western experience. As Peter the Great opened Russia to European influence in the seventeenth century, Russia was caught between two spiritual influences: Orthodox Christianity, which arrived at the turn of the first Millennium, and a deeper, pagan and superstitious past, where Nature was understood as being governed by spirits of the forest[3] and other, darker influences. As Figes noted, "...the peasants' religion was far from the bookish religion of the clergy. They mixed pagan cults and superstitions, magic and

[1] "An ornamental pattern that is drawn across cloth, structurally twisted into cruciform interweaving of warp and weft, directed upwards at the end of the towel, displays linear conception of horizontal and vertical ties, the Universe, three levels of world's space that are cosmological in their origin". http://www.belarusguide.com/culture1/visual arts/ Belarusian rushnik.htm

[2] Ibid. Icons in the home are described in : Billington, JH (1966/1970): *The Icon and the Axe: An interpretative history of Russian culture*. Vintage Books. Pp 28-9

[3] Леший

sorcery, with their adherence to Orthodox beliefs. This was the peasants' own vernacular religion shaped to fit the needs of their precarious farming lives".[4]

Isolated from the Western struggle for rationalism, Russia embraced nineteenth century science within her own traditions[5]. Her modern history is built as much on *sobornost* as on *grozhny* – a walled, defensive community of common ethnicity, surrounded by enemies. As many have found, to attack a *Grozhny* is as wise a move as to poke a sleeping bear in the eye with a short stick[6].

Russian philosophy embraced the Cosmos in a debate that is still unresolved. Although her modern scientific and technological achievements in space are second to none, the popular cosmology is not yet fully understood, embracing Orthodox Christianity as it does now almost a century of Marxist-Leninism.

Russian Cosmism

The Bolshevik government finally seized power in 1917 after a period of intense agitation, revolt and inspiration bursting through the repression of tsarist Russia. Space and the sky were important visions of these times and the times leading up to them. The revolutionary bomb-maker and anarchist – some would now say terrorist[7] – Niikolai Kibalch'ich (1853-1881) acted within debates both revolutionary and cosmic. A dynamite expert, he was executed for the bloody assassination of Tsar

[4] Figes, O (1996): *A People's Tragedy:The Russian Revolution 1891-1924*. Jonathan Cape. Pp66-67
[5] "Orthodox theologians had long disparaged rationalism as a thing of the "Latin West". In the 1940s this theme was taken up by the Slavophiles, a group of intellectuals who maintained that western ideas and institutions were not suited to Russia..." p10 Rosenthal, BG (1997): *Introduction:* and ed: *The Occult in Russian and Soviet Culture*. Cornell UP.
[6] My Russian tutor at МГУ explained this importance to me.
[7] Croft, LB(2006): *Nikolai Ivanovich Kibalchich- Terrorist Rocket Pioneer*. Lulu

Aleksandr II, but he is remembered more for the fact that the night before his execution, he sketched a rocket-powered flying machine.

There is a place in the history of rocketry for Kibal'chich, first guaranteed by the issue of a Soviet postage stamp in 1964, later by the same honour from the state of Ukraine in 2002 which has now claimed him (Figure 1.1).

Figure 1.1: Kibal'chich (*left*) on a Soviet Union stamp, and (*right*) on a Ukrainian stamp.

Kibalch'ich's short life span fell within that of the early proposer of what came to be known as "Russian Cosmism", Nikolai Fedorov (1828-1903), a man who rose, with exceptional piety and asceticism, to become a librarian in the Rumiantsev Museum (now the Lenin Library) in Moscow.

Fedorov taught that science could and should solve the problems of Russian society. He drew a distinction between the learned minority and the unlearned majority, and argued that the learned should not promote technology creating useless commerce, but science promoting order, regulation, peace and harmony, and the defeat of death by rational means. He was interested in magnetism and the telegraph, and in

meteorology he saw an opportunity to regulate rainfall to the benefit of agriculture by firing artillery rounds into clouds and forcing rainfall into drought-struck land below[8].

Professor N.A Senitsky, an economist and philosopher exiled in Harbin, China, saw in the Soviet government of 1932 "a doubtless influence and fulfilment of Fedorov's ideas, though for the most part his name, having a strong religious colouring, is never mentioned".[9] Certainly modern Russian technology is credited with the ability to force rainclouds to disgorge their contents before they are blown to unwanted areas[10]. But Fedorov's Cosmism embraced a further responsibility which to the Western rationalist mind seems bizarre. He preached a moral duty on mankind to explore the Cosmos to find the atoms of dead human ancestors and to use science to make them whole again, to resurrect them in some form, and to populate the solar system and beyond with the whole of the humankind, present and past.

For Fedorov, an Orthodox church building represented Heaven, and its iconostasis the representations of deceased generations. "During the divine service" he wrote "these celestial beings join in worship with the clergy and congregation, so that both the living and the dead constitute one church".[11] Fedorov saw Christian resurrection (as told in the Easter story) as a moral goal for humankind, requiring space travel

[8] Koutaissoff, E and Minto M (eds)(1990 edition): *What was man created for? The philosophy of the common task by NF Fedorov and selected works translated from the Russian and abridged*. Honeyglen Publishing.
[9] Quotation from *On the Ultimate Ideal* as presented in Lossky, NO (1952): *History of Russian Philosophy*: George Allen & Unwin. P78-9
[10] This is said famously to be the reason for blue skies over the military parades in Moscow, and more sinisterly, to explain why the radioactive rain cloud from Chernobyl power station disaster fell over Belarus and not Moscow.
[11] Fedorov, NF (n.d.) :*Supramoralism or general synthesis (universal union)* P124 In Koutaissoff and Minto (eds), op cit, pp-105-136.

and colonisation as a means to provide habitation for resurrected beings in whatever form they were to take. Dostoevsky clarified that he meant resurrection in a living and real sense, not as memories in successive generations.[12]

As well as Dostoevsky, Fedorov's ideas inspired amongst others the Russian authors Maxim Gorky and Leo Tolstoy. He was, without doubt, influential in his period. Although a causal connection cannot be proved, a young man, suffering from deafness after polio, educating himself in Fedorov's library, Konstantin Tsiolkovsky (1857-1935) from Kaluga, was to become both a key rocket scientist and after Fedorov the standard-bearer of Cosmism. In his later works – including for example "*Prichina Kosmosa*" (The Cause of the Cosmos, 1925), which is on display in the Tsiolkovsky House and Museum in Kaluga, three hours' drive from Moscow – Tsiolkovsky expanded upon a Cosmic philosophy that included the existence of conscious, intelligent beings more perfect than humans but ethereal and incomprehensible, sometimes in communication with humans.[13]

It is widely acknowledged in Russia today that Tsiolkovsky saw Russian space exploration in similar terms to Fedorov. Travel in the Cosmos was for him too a question of morality as much as one of science and technology. In 1926 Tsiolkovsky defined his "Plan of Space Exploration", consisting of sixteen steps for human expansion into space[14]:

1) Creation of rocket airplanes with wings.

[12] Dostoevsky, F (1897): Letter to NP Peterson. In: Koutaissoff and Minto (eds), op.cit.pp227-9
[13] Hagemeister, M: *Russian Cosmism in the 1920s and today*. In BG Rosenthal, op. cit. P197
[14] http://www.informatics.org/museum/tsiol.html

2) Progressively increasing the speed and altitude of these airplanes.

3) Production of real rockets-without wings.

4) Ability to land on the surface of the sea.

5) Reaching escape velocity (about 8 Km/second), and the first flight into Earth orbit.

6) Lengthening rocket flight times in space.

7) Experimental use of plants to make an artificial atmosphere in spaceships.

8) Using pressurized space suits for activity outside of spaceships.

9) Making orbiting greenhouses for plants.

10) Constructing large orbital habitats around the Earth.

11) Using solar radiation to grow food, to heat space quarters, and for transport throughout the Solar System.

12) Colonization of the asteroid belt.

13) Colonization of the entire Solar System and beyond.

14) Achievement of individual and social perfection.

15) Overcrowding of the Solar System and the colonization of the Milky Way (the Galaxy).

16) The Sun begins to die and the people remaining in the Solar System's population go to other suns.

Chapter 4 will review the history of Russian space travel following these stages. A reasonable assessment in these terms in 2010 suggests we as humankind have achieved step 10.

But at the turn of the century Tsiolkovsky was known popularly as an inspirational novelist of science fiction, and within the international community of rocket pioneers as a mathematician and creator of the "Tsiolkovsky equation" which for the first time

defined the power that a rocket would need to escape Earth's gravity and enter orbit. Tsiolkovsky was the inspirational theoretician behind the engineering group known as GIRD, which was to build the first Soviet rockets, and ultimately, propel the first man into space. It is for these reasons that his name was honoured by the Soviet government in 1967 with the opening of the State Museum of the History of Cosmonautics in Kaluga.

The avant-garde, the Bolshevik Revolution and Stalin

Russian Cosmism, in its weak form merely a looking-out to the Cosmos, inspired equally Konstantin Tsiolkovsky and Kazimir Malevich, the Supremacist painter whose post-Cubist geometric abstract paintings were "freed from the constraints of gravity".[15] Referring to the peasant's icon corner, "It is no accident" opines one commentator "that Malevich's Black Square is hanging up in the corner of the exhibition".[16] The black square "in the first instance, was a picture of the open black Cosmos. People dreamed of overcoming the earth's gravitational field, radically shaking off that pull which not only keeps human beings pressed to the earth's surface, but which also ultimately sees them under a layer of earth."[17] Malevich continued to explore cosmic space in a series of challenges to horizontal and vertical space, the Architectons.[18]

[15]Galayev, BM: *Russian Cosmism and the Russian Avant-Garde*. http://muse.jhu.edu/journals/leonardo/v034/34.1galeyev02.html
[16]http://counterlightsrantsandblather1.blogspot.com/2009/08/russian-avant-garde=part-`-supremantism.html
[17] Groys, Boris (2006): *Ilya Kabokov- The Man Who Flew into Space from his Apartment*. One work series, Afterall books. pp12
[18] http://max.mmlc.northwestern.edu/~mdenner/Drama/visualarts/Constructivism/29architectons.html

The iconostasis, the peasant's record of history within a spiritual context, survived the Bolshevik revolution in a most unlikely manner. The failure of the Bolsheviks' New Economic Policy in the first few years after the revolution led to control being taken by Lenin. His death, and the rise of Stalin, prompted the rise of a public and private expression of the Lenin cult. In areas of mass congregation – including factories and schools – "Lenin corners" were created, where his icon looked down on the assembly.[19] His body embalmed in the Lenin mausoleum, it was as if Lenin had been resurrected.

At the same time a group of engineers came together to form the first team in Russia dedicated to the research and development of rockets for interplanetary travel. The GIRD group (the Russian acronym referred to engineers working on reactive engines) included Friedrich Tsander from Riga, Sergey Korolev from Zhytomir in the Ukraine, and Mikhail Tikhonravov. It was Tsander who presented papers to Moscow institutions about interplanetary flight[20] and famously in 1924, when asked in a public lecture why anyone would want to go to Mars, refers to it being a red (socialist) star[21]. But he surveyed the planets for the presence of an atmosphere, and looked for those which could sustain life.

[19] Tumarkin, N (1983): *Political Ritual and the Cult of Lenin*. Human Rights Quarterly (5) 1983 pp 203-206

[20] See: Appendix 1 (Summary of the lecture on my spaceship, delivered at the theroretical section of the Moscow Society of astronomers, 20 January 1924), and Appendix 2: (Report of FA Tsander on the proposed projects of the scientific research section of the society of interplanetary communication, delivered 15July 1924) IN: Problems of flight by jet propulsion interplanetary flights **Author(s):** Korneev, L. K.; **Tsander**,**F.**A.**Abstract:**Rocket technology and interplanetary flight - early 20th century papers. **NASA Center:** NASA (non Center Specific) **Publication Year:** 1964 Added to NTRS: 2009-07-29 Accession Number: 65N10640; Document ID: 19650001039; Report Number: NASA-TT-F-147, OTS-63-11195 (source: http://ntrs.nasa.gov/search.jsp?N=0&Ntk=AuthorList&Ntx=mode%20matchall&Ntt=F%20TSANDER).

[21] See: http://www.daviddarling.info/encyclopaedia/T/Tsander.html

Stalin saw the sky and Cosmos, not as resting places before resurrection, but as places to be conquered. Record flights over arctic wastes in the 1930s created instant folk heroes who represented Soviet values of technological prowess and heroic achievement.[22] They inspired workers to themselves break through the permafrost and build new cities in the mineral-rich far North. But as Stalin's wave of repressions began to unfold over the Soviet Union, it was to engulf in 1938 even Korolev of the GIRD group, who was arrested and imprisoned in Siberia until almost the end of the Great Patriotic War.

The narrative in Chapter 4 will show how the GIRD team led the Soviet Union to explore the Moon, the planets in the solar system and to develop expertise in long duration missions in near Earth orbit. Most of these missions had been predicted in Tsiolkovsky's fiction, which described in 1893 an orbital spacecraft, and a landing on the Moon, and worked through the possibility of a colonised space station (actually at the Lagrange points).[23] Tsiolkovsky the Cosmist therefore identified more than a century ago three main destinations of space travel: Earth orbit, landing on the Moon, and a space station. These were destinations whose imperative was, for Cosmism, a moral objective for humankind, for the resurrection of the dead to populate.

[22] Stites, R (1992): *Russian Popular Culture: Entertainment and Society since 1900*. Cambridge University Press
[23] Tsiolkovsky, K (1893): *On the Moon*. In: Starchild, Adam (ed) *The Science fiction of Konstantin Tsiolkovsky*

Russian manned spaceflight started for humankind in 1961 and continues to this day. Presented at that time as Soviet achievement and heroism, for Khruschev they were the successor to the arctic flights presented by Stalin. But by the 1980s Russian Cosmism was being raised again within the national debate. Cosmonaut V.I. Sevast'yanov persuaded the Institute of Philosphy of the Academy of Sciences of the USSR to publish a 700 page volume of Fedorov's Cosmic philosophy.[24] Although this volume was quickly rendered unavailable, it is interesting to note that in 2001 (after the fall of the USSR) Sevast'yanov participated in a seminar series entitled (in English) *A Weapon-free Space – the Arena of Peaceful Cooperation in the 21th Century,* at which Cosmism, Fedorov, and Tsiolkovsky's space philosophy were discussed.

Sevast'yanov's contribution to the 2001 conference was on the significance of Cosmonautics for the sustainable development of Russia.[25] This concern for ecology is part of the modern form of Russian Cosmism.[26] It is to Western eyes a New Age philosophy, open to strange beliefs. Tsiolkovsky's interest in ethereal Cosmic beings is expressed in a Cosmonautics museum in Kharkiv, Ukraine, dedicated to the study of cosmonautics, but including a local artist's creations representing cosmic alien beings and UFOs, It was opened by Sergey N. Samburov, who works for RKK Energia in Korolev City near Moscow and is Tsiolkovsky's great-grandson.[27]

[24] Koutaissoff, E (1990): *Introduction.* In Koutaissoff and Minto (eds), op cit, p 13
[25] http://www.mid.ru/ns-dvbr.nsf/853667ff9506854843256a170042d4fc/e1f8e228ac6df98643256a250058c92e/$FILE/program.doc
[26] Richards, S (2009): *The fairy tale that gripped Russia*. Financial Times (London) 15 August 2009.
[27] http://planetarium-kharkov.org/?q=kharkov-planetarium-eng

The involvement of the Russian Orthodox Church in Cosmonautics since the fall of the Soviet Union has been well documented. Pop describes Khruschev's jocular account of Soviet atheism in space and records the presence of Orthodox icons in the International Space Station (ISS). He sees "a religious substratum in the Russian and Soviet space programs".[28] Cosmonaut Maxim Suarev described in 2009 the presence of Orthodox icons on board the ISS: "We have four holy icons on the Russia segment. We also have the Gospels and a big cross (the Lord's Divine Cross was handed over to the head of RosCosmos, A.N.Perminov, by the late Patriarch Aleksy II. The cross was delivered to the station by the crew of Soyuz TMA-8 in 2006 – "Russia Today" ed.) And I have a reliquary cross in my cabin. A priest gave it to me at Baikonur before the launch. Father Job told me a piece of the original cross on which Jesus was crucified is contained in mine. My cross was blessed in the Lavra (a monastic site - "Russia Today" ed.) in Sergiev Posad. It will be with me the whole expedition and will return with me to Earth." [29]

Figure 1.2: The iconostasis at the Russian segment of the International Space Station.

[28] Pop, V (2009): *Viewpoint: Space and Religion in Russia: Cosmonaut worship to Orthodox revival*. Astropolitics (7) pp150-163
http://www.informaworld.com/smpp/content~content=a912941757~db=all~jumptype=rss
[29] http://rt.com/About_Us/Blogs/orbital-log/2009-11-17.html

But closer inspection of the improvised orbital iconostasis is revealing (Figure 1.2). The Orthodox icons are visible next to portrait photographs of First Cosmonaut Yuri Gagarin, the Chief Designer Sergey Korolev, and Cosmist and theoretician Konstantin Tsiolkovsky. As Chapter 5 will argue, portraits can represent a person, character or mind, a role, or an agent. What does the equivalence between the holy icons and the historic portraits suggest ?

The words reported of the first priest of the Orthodox communion formed at the launch complex in Baikonur in 1992, Father Sergey, are significant in this question: "Nearly ninety percent of the population of Baikonur is composed of people with a higher education. I am convinced that educated people are able to progress much faster on the spiritual ladder and the Baikonur parish is a shining example of this".[30]

Nikolai Fedorov, distinguishing the learned from the unlearned, could hardly have put it better. The use of Orthodox icons in space should be considered not so much as the rise of religion over Marxist-Leninism but as the continuation of the Russian Cosmist movement. As Mayor of Moscow Yuri Luzhkov wrote in 2007, "Russian Cosmos is an image, a philosophical notion, a practice and we are glad to share it with our friends in the whole world - our common motherland Earth." [31]

When Gagarin's portrait sits next to the holy icon it is as if he, too, has been resurrected. For Russian Cosmism would dictate: Gagarin Lives!

[30] Oberg, James (2006): Russian space city builds new route to heaves?: New church in once atheist Baikonur readies for Orthodox. http://www.msnbc.msn.com/id/10729300/

[31] Luzhkov wrote in the context of supporting a Moscow artist. http://naftalieva.com/eng1/news/kosmizm.htm

*

This introductory chapter asserts the existence of a characteristically Russian popular culture of space exploration. Its roots are in the forest and the home, it absorbs pagan and Orthodox Christian concepts, and it has survived Communism. *Kultura Kosmosa*, it is asserted, is the driving force behind the Soviet Union's achievements in space, and the achievements of the Russian Federation and nearby countries.

Chapter 2: Methodology

The methodologies used in this study are analytical and descriptive, based both on inferential and empirical techniques. The principal methodology adopted in this dissertation is to establish and follow a "golden thread", referring to the Russian Cosmism identified in the Introduction, and investigating its presence (in a strong or weak form) through a narrative provided in subsequent Chapters.

Collier *et al*. identified appropriate steps in the research cycle as in Figure 2.1 below.[32] The cycle in this dissertation is driven along the "golden thread" and starts by identifying the *research problem*, which in this dissertation is to identify the characteristic popular culture of space travel in Russia, "Kul'tura Kosmosa". The *theory* (step B) is that "Kul'tura Kosmosa" is based on a longstanding Cosmism that looks backwards to the Russian philosophy, paganism and Orthodox Christianity of the nineteenth century, and forward through ecology and the natural environment, embracing dialectical materialism in the Soviet Union along the way. The study moves on to look at selected cases in the literature, and observations made in Russia and parts of the former Soviet empire and sphere of influence.

[32] Collier, D Seawright J and Munck GL: *The Quest for Standards: King, Keohand, and Verba's "Designing Social Enquiry"* page 57. In: Brady H E and Collier D (eds) (2004): *Rethinking Social Enquiry – Diverse tools, shared standards.* Rowan and Littlefield.

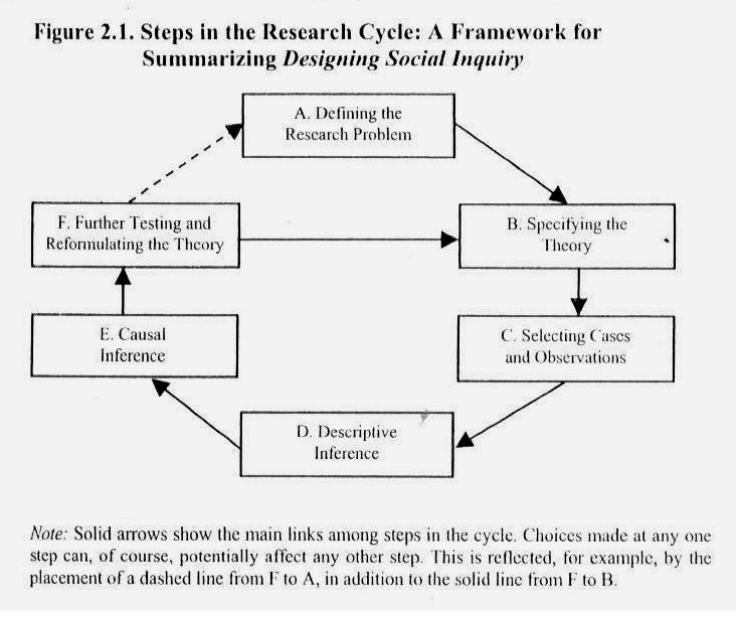

Figure 2.1: steps in the research cycle

Whilst Collier *et al*.'s system looks for causal inference by finding dependent and independent variables, this dissertation does not infer cause in this way. Instead, with Gaddes, the idea of identifying necessary and sufficient conditions is preferred to choosing independent and dependent variables.[33] This historical narrative can be considered as a complex system of interactions of variables (including events and people) set in a context of time.

In general, consequences of this type of interaction can be unexpected. With an echo of Heisenberg's Uncertainty Principle, Jervis, looking at confrontation between nation-states, comments that "we cannot look at one side while holding the other side constant because even to explain one side's decisions, we need to capture its

[33] Gaddes, JL (2002): *The Landscape of History*. Oxford University Press. p97

estimate of the other side's likely response, which in turn is influenced by what it thinks the other thinks the state will do".[34] The "golden thread" is considered to be present throughout such a complex system, and subsequent Chapters will contrast one key dynamic against another.

The approach will include both interrogations of source material and interactions with people and objects. Within these dynamics, the principal methodologies originate from: Museum Studies; Oral History; Semiology; and Collective Remembering.

Museum studies

Although visiting a museum might be seen intuitively to be an interrogation of artefacts, Fraser sees much of the museum experience as interactive. She identifies five components of the visitor experience of museums: making meaning within the museum as a visitor performance; the affirmation and construction of the visitor's identity; the ritual by which the museum creates opportunities for the visitor to make meaning; the dynamic transaction between the visitor and the individual object; and the power of the museum, its negotiation of the meaning with the visitor.[35]

In approaching these exhibitions an individual born and raised without significant exposure to Russian culture (as this author) necessarily approaches in a spirit of Brechtian *Verfremdung* (alienation), and questions of identity and meaning are not always clear. To study these components of the visitor interaction therefore requires the help of some classification.

[34] Jervis, R(1997): *System effects: Complexity in Political and Social life* Princeton UP p85
[35] Fraser, J (2007): *Museums –Drama, Ritual and Power*. In: Knell, SJ, MacLeod S and Watson S: *Museum Revolutions: How museums change and are changed*. Routledge 2007.

Three distinct groups of presentations emerge: state museums of Cosmonautics in the Russian Federation; "personal" Cosmonaut museums in Russia, Belarus, Ukraine, and (possibly in this category) Latvia; and representation in the former "socialist" and other countries which participated in the *InterCosmos* programme.[36] The *InterCosmos* museum displays will in Chapter 5 be contrasted against the first two types.

Within the Russian Federation, the KE Tsiolkovsky State Museum of the History of Cosmonautics at Kaluga and the Memorial Museum of Cosmonautics in Moscow contain many space relics – old equipment and memorabilia – and give a narrative of key events in the Russian Space programme as a whole located in time. Technical specifications of space hardware of epic voyages are given. There are reconstructions of historical scenes or of imaginary space vehicles. Individual Cosmonauts are remembered, as they were when they were active Cosmonauts, even if they are still living, and there is visible endorsement by the state, in the form of medallions or certificates whether awarded by the Russian Federation or by the Soviet Union.

Within the Russian Federation, Belarus, and Latvia, the home villages or towns associated with the life of Cosmonauts or pioneering researchers are honoured by a museum relating to space exploration. In this study, field visits have taken place to the following: Cosmonaut Gagarin's home village outside Gagarin city, RF; Cosmonaut German Titov's home village outside Barnaul in Siberia, RF; Cosmonaut

[36] Aides-memoire of my visits to some of these museums can be accessed from: http://sites.google.com/site/andythomasorg/kultura-kosmosa

Pyotr Klimuk's village outside Brest in Belarus; Cosmonaut Kovelenok's village outside Minsk in Belarus; the house-museum of Konstantin Tsiolkovsky in Kaluga, RF; the Cosmonautics Museum named after SP Korolev in Zhytomir, Ukraine; the Planetarium-Museum in Kharkiv, Ukraine; the Deutsche Raumfartaustelling in Cosmonaut Sigmund Jähn's home village, Morgenröthe-Rautenkranz, Germany; and the Friedrich Tsander museum in Riga, Latvia.

In all cases in Russia and Belarus there is a bust or statue of the Cosmonaut on display in the village or nearest large town whether or not the Cosmonaut is alive or dead. These museums honour the individual as a famous son of the town. The Cosmonaut's parents and siblings are portrayed and the museum itself is either in a restored family or school property or contains a model reconstruction of it. Often the Cosmonaut as a boy – they were nearly all boys - is represented by his school desk or at least a photograph of it. (Figure 2.2 below shows a similar photograph of Cosmonaut Pavel Popovitch returning to his school outside Kiev). The school register showing the Cosmonaut's name is on display. The space vehicle itself is not present but the museum contains smaller artefacts such as fragments of rockets or space related kit. Honours from the Soviet Union are on display and photographs might show the Cosmonaut with other famous people, including politicians and other heroes from the village or nearby. There is some reference to the military achievement of the Cosmonaut.