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Investigating Space Heritage Interpretation for Tourism Development and Heritage Preservation at Baikonur Cosmodrome, Kazakhstan

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ABSTRACT

Space heritage has become a new source of tourism development for destinations where major spaceports are located. As the world's first and largest operational spaceport for orbital and human launches, the Baikonur Cosmodrome in Kazakhstan stands out for its historical significance, but its heritage remains largely uninterpreted for tourism. Particularly, the environmental impacts induced by terrestrial space activity on surrounding environments and communities are overlooked in local museums and guided tours. Using a qualitative case study research approach with twenty-six stakeholders directly or indirectly involved in the management of Baikonur, this study explores how post-Soviet space heritage is interpreted and presented by various stakeholders involved in the development of tourism. Three themes are identified for planning implications at the Cosmodrome: governance of Baikonur and space heritage interpretation; space heritage interpretation and environmental issues; and multi-stakeholder roles in space heritage preservation and development.

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Introduction

Despite being the world's largest landlocked country and a former Soviet Republic, Kazakhstan possesses numerous heritage tourism destinations based on its past Soviet times, nomadic culture, and a variety of unique natural landscapes and World Heritage Sites (Tiberghien, 2019). As the world's first and largest operational spaceport for orbital and human launches, the Baikonur Cosmodrome in Kazakhstan has a major historical significance, but its heritage remains yet to be interpreted for tourism development.

As a territory leased by the Kazakh government to Russia until 2050, the management of space heritage and governance models at Baikonur tends to focus principally on the heritage of the Soviet Union. Currently, tours and museums at Baikonur heritage offer a limited and controlled account of the space heritage while ignoring its environmental

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impacts. The narratives they present regarding the historical experience of Soviet heritage are constrained and influenced by government for visitors in the context of an acceptable past that tends to glorify the achievements of the space programme during the Soviet period while ignoring other stakeholders' views; particularly the ones from environmental NGOs and local tourism suppliers documenting important environmental impacts of rocket wreckages, toxic substances, and waste by-products on the Kazakhstani landscapes and dependent communities (Abdrzak & Musa, 2015; Dallas et al., 2020; Kopack, 2019).

This study thus aims to examine two theoretical aspects: stakeholder heritage interpretation; and the management of tourism development in relation to a study site where these issues are at the core of the space heritage tourism development strategy. More particularly, theoretical concepts of the study encompassing the role of stakeholder involvement in heritage interpretation, the relationship between heritage interpretation and the development of tourism for preserving cultural heritage need to be explored in the context of Soviet and post-Soviet space heritage.

Therefore, this paper aims to offer a first account about how space heritage in Kazakhstan is interpreted for tourism development by stakeholders including policymakers, tour operators, museum curators and guides, environmental NGOs and historians of the space industry. To address this aim, we pose two main research questions:

- (1) From a multi-stakeholder approach, how is the historical interpretation of space heritage shaped for tourism?
 - To what extent are various stakeholders' opinions represented in the Baikonur story telling?
 - What is the historical narrative of space heritage and related environmental issues at Baikonur museums and sites?
- (2) In what ways can Baikonur heritage practices influence the planning and development of tourism and wider heritage preservation?
 - How can the Baikonur space heritage be developed as educational tourism for visitors and dependent communities?
 - How can the Baikonur space heritage be preserved for international tourism?

First, we will consider selectivity in interpretation in the space museum contents and the extent to which they are ideologically influenced. Second, stakeholders' heritage tourism practices at Baikonur and how they influence policy decision-making in the planning and development of tourism and space heritage preservation will be examined.

Stakeholders' selective heritage interpretation and tourism development

Research interest in heritage and its interpretation has been a growing phenomenon since the late twentieth century (Herbert, 2001) which has been widely viewed as an integral part of the extent to which culture can be consciously chosen, explicitly valued, and shared with the public. For Ashworth (2011, p. 2), heritage can be viewed "as a process whereby objects, events, sites, performances and personalities, derived from the past, are transformed into experiences in and for the present". Heritage interpretation for tourism development is a complex phenomenon characterised by an interplay between various stakeholders' perspectives reflective of their roles and involvement in

the management and development of the sites (Frew, 2012; Wight & Lennon, 2007). The need for interpretation work has arisen in response to needs of places to understand their unique characteristics and place identity which can play an important role in enhancing people's awareness, understanding and appreciation of time and place (Uzzell, 1996).

Hardy (1988) differentiates heritage into conservative and radical concepts. In a conservative sense, heritage refers to cultural traditions and artefacts from the past. In a radical sense, heritage is a value-loaded concept, embracing (and often obscuring) differences of interpretation that are dependent on key variables, such as locality; and with the concept itself locked into wider frameworks of dominant and subversive ideologies, where the idea of heritage can be seen either to reinforce or to challenge existing patterns of power (p. 333). Therefore, at times history and heritage appear to be opposed (Samuel, 1994); with heritage not necessarily being the popular nostalgic rediscovery of the past, but an area of dispute as different groups claim different versions of the past as significant and requiring custodianship (Cassia, 1999). Consequently, analysis of the past must consider which heritage is interpreted and developed and what historical contents are neglected (Lowenthal, 1998; Timothy & Boyd, 2006).

In the former Soviet Union, it is often the case that various interpretations of heritage can coalesce into a movement to reshape history and reinforce stereotypical images of heritage and cultural presentations (Assipova & Minnaert, 2014; Lennon & Tiberghien, 2022). For industrial heritage sites such as the Baikonur Cosmodrome, the contention of tourism development is that "darker sides of industrialization paths and aspects of industrialization go unmentioned or are hidden in the heritage contexts" (Macdonald, 2006, p. 9). This kind of "sanitization" is a form of "prescriptive forgetting" or "repressive erasure", further indicating that heritage is often fashioned from selective memories to fit the current political agenda (Connerton, 2008; Lennon & Tiberghien, 2020).

Ashworth (2011) argues that the commemoration and interpretation of heritage can be deliberately selected to satisfy contemporary needs and demands. For Uzzell (1998), interpretation needs to meet a number of visitors' requests in terms of information provided and quality of activities proposed (see also De Rojas & Camarero, 2008), and therefore needs to be plural and serve a variety of narratives. In heritage museums, the category of stakeholders who own the site and the ones who can be involved in the story of the site is key to the construction of the narratives delivered. The objects and events of a particular time period may be appropriated to construct a story (or a myth) that conforms to the economic, social, and political interests in a particular domain (Bruner, 1994), providing an interpretation that supports a particular ideological framework (Poria et al., 2009). Because stakeholders can contest what constitutes an authentic heritage narrative and how to present it (Lennon, 2018), it is therefore important to ensure the interpretation is genuine to the site's history and to the ways the stories are conveyed and perceived by the local and general public, but also by the stakeholders involved in the making and delivery of these narratives.

Since there are a number of interested parties, consultation with these stakeholders is an important part of the process towards establishing appropriate heritage interpretation and managerial practices of the site (Hollow & Spennemann, 2001). By focusing on tangible and intangible heritage that have a high perceived value by the stakeholders involved, appropriate on-site interpretation can contribute to the effective management of tourist attractions and satisfy visitors' needs for uniqueness and authenticity (Pearce et al., 1998).

Specific care and appropriate means of communicating heritage are required, particularly with the local communities who have been impacted. The interpretation techniques used to communicate about the sites vary according to the person telling the story, how it's being told and where it is being told (Hollow, 2001). Telling a story around tangible and intangible historical assets can provide visitors meaningful heritage activities and interpretation of the sites visited (Moscardo, 1998). For Carr (2008) and Pfister (2000), the potential incorporation of storytelling by locals themselves into heritage can greatly influence the understanding of the "sense of place". Storytelling using multi-frames narratives that intertwine social time and human actions can be used as a way to impact individual and public memory, build community and create a sense of identity and space through effective narratives (Dal Falco & Vassos, 2017; Ngoepe et al., 2021). As heritage assets have little meaning on their own unless their context or story can be described to the visitors, conveying a story by the impacted communities themselves through oral histories can be especially useful for potential visitors who have little knowledge about the local history and heritage of a destination.

Space heritage preservation and interpretation of environmental impacts

The importance of preserving cultural heritage through tourism is receiving increasing attention (Aas et al., 2005; Akbar et al., 2020; Xie et al., 2020). The preservation of heritage can include a broad spectrum of tangible and intangible aspects by a group of stakeholders involved in the valuation of heritage, including local communities. In some cases, protecting heritage sites necessitates the practical role of the local community and their public involvement in the preservation measures beyond tourism stakeholders involved in the management of the sites (Haddad & Fakhoury, 2016; Xie et al., 2020).

Ruggles and Silverman (2009) argue that cultural heritage is shaped by a society whose norms and values attribute differential importance to the objects presumed important and tangential to its heritage. However, at times the use of interpretation for some sites can compromise the preservation of heritage in some way (Howard, 2003), particularly for sites that have a universal historical significance (UNESCO, 2017b). In the context of Baikonur, "space heritage" emphasises the sites or facilities that were uniquely suited to the design, construction, and use of instrumentation that flew in space; as well as structures and environments unique to the history of the mission or event. Because space heritage sites can be "geographical landmarks where instrument packages were conceived and built, tested, launched, controlled, analysed, or somehow employed in the generation of new knowledge about space and the things in space" (De Vorkin, 2010, p. 229), its preservation and interpretation is complex particularly when questions of sustainability and governance need to be addressed (Fawkes, 2007).

The very rationale of sustainability has been intensively debated regarding whether space tourism can be sustainable (Cohen, 2017; Spector et al., 2017), with the current political and legal frameworks needing considerable development to respond to space tourism development and its interpretation for tourism purposes. Space launches and spaceports can cause severe environmental issues, such as massive carbon and particulate emissions, leading to the air pollution, climate change and environmental deterioration on the earth, as well as the debris, garbage, and pollution for the surrounding communities (Collins & Autino, 2010; Spennemann, 2004). In Kazakhstan, the Baikonur

Cosmodrome is associated with various environmental concerns including mass deaths of birds and wildlife along the flight paths both in Kazakhstan and beyond, as well as increased cancer rates and acid rains in the surrounding environments (Blom & Mauno, 2021; Kenessov et al., 2008; Kopack, 2020).

Because the management, planning, and monitoring processes of sustainable tourism is often influenced by the political environment (Bramwell & Lane, 2011), which in turn determines local communities satisfaction with life in the tourism destination and thus their support for tourism in their community (Mihalič et al., 2016), the narratives developed around the environmental legacies of the Cosmodrome in the museum contents can be problematic, especially as the community has relatively weak destination governance due to the political environment being underdeveloped (see also Akbar et al., 2020). To this end, questions of how Baikonur heritage practices influence the planning and development of tourism and wider heritage preservation will be later discussed in this paper.

Research setting: Baikonur Cosmodrome

The Baikonur Cosmodrome, the Baikonur Museum and the Museum of Baikonur Cosmodrome History are identified as the research settings for this study. Founded in 1957, the Baikonur Cosmodrome saw the first rocket and the first astronaut into space (Yuriy Gagarin) successfully launched. The name “Baikonur” is widely known as the location from where the first flight to space was launched. For nearly sixty years, Baikonur (see Figure 1) was the biggest civilian and military launching base in the world in terms of



Figure 1. Map of Kazakhstan and the location of the Baikonur Cosmodrome.

Source: Encyclopædia Britannica.

space achievements. Towards the end of 1954, a location near the village of *Tyuratam*, a small mining town in the heart of the Kazakh Steppe in the Kyzylorda region was chosen to host the Cosmodrome (Villain, 1996).

As means to hide the original location of the site at the time of Gagarin's flight, Tyuratam was renamed name Baikonur in 1961. The Soviet Union provided "the decoy coordinates and name of the launch site in order to preserve the secrecy of its location" (Gruntman, 2019, p. 360); then renamed the town as Leninsk (ЛЕНИНСК) from 1966 until 1995; and then renamed Baikonur by a decree signed by Russian and Kazakh Presidents Boris Yeltsin and Nursultan Nazarbayev on 20 December 1995. Several generations of cosmonauts, orbital stations, and lunar and planetary space missions then departed from its launchpad, "paving the road to a number of successful launches to the International Space Station (ISS)" (Marov, 2017, p. 285).

Comprising nine launch complexes with fourteen launch pads, thirty-four engineering complexes, three fuelling stations for space vehicles and two aerodromes, Baikonur Cosmodrome is the largest space complex in the world and has been the space facility and centre of operations for the Soviet and subsequently the Russian space programme since its creation. The "launch pad no. 1", known as "Gagarinskiy Start" (Gagarin's launch pad, [Figure 2](#)) is located 30 km north of Baikonur city. The launch pad and an associated assembly building formed the initial facility where military and space developments took place at Baikonur. The eastern section of the Cosmodrome, which came into operation in 1961, was used for testing a range of ballistic missiles and rocket launchers including the successful Союз (*Soyuz*) spacecraft.

Since the disintegration of the Soviet Union in 1991, numerous commercial, military and scientific missions both manned and unmanned are launched annually as part of the current Russian space programme, jointly managed by the Russian Federal Space Agency (Roscosmos) and the Russian Space Forces. In 2004, the Baikonur Cosmodrome



Figure 2. Gagarin's launch pad.

Source: Alexander Yermolyonok.

has been leased by the Kazakh government to Russia until 2050 for a fixed rent of US\$ 115 million per annum, with each country holding a 50% stake.

Currently, the Baikonur heritage tours and museums attract a very small number of tourists (approximately 10,000 per year) (Advantour, 2023). Typical tours of Baikonur include a visit to the launch pad, the control centre “Buran Energy”, the “Soyuz” and “Zenit” areas, the Rocketeers Memorial and the Museum of Cosmodrome History during the first day. Created in 1967 and located 40 km from the Baikonur Cosmodrome, the Museum of Baikonur Cosmodrome History introduces its guests to the history of the construction of Baikonur city and the Baikonur space centre. The second day is dedicated to the visit of the “Cosmonaut” hotel, the “Buran” Orbital Spaceship, the Baikonur Museum which includes exhibits of astronaut memorabilia, insights into rocket construction, history of space exploration and an open-air museum of rocket engines; and a visit to the houses of the father of Russian cosmonautics Sergey Korolev and of Yuriy Gagarin adjacent to the museum (Nomadic Travel Kazakhstan, 2022).

Methodology

This project follows a qualitative case study methodology and adopts an explorative/interpretive approach to explore the interpretation of Baikonur space heritage. The two main research questions of the study (How is the historical interpretation of space heritage shaped for tourism? In what ways can Baikonur heritage practices influence the planning and development of tourism and wider heritage preservation?) are addressed using a mixed method research design, including semi-structured interviews with 26 key stakeholders (Tables 1 and 2) identified through snowballing sampling who are directly or indirectly involved in Baikonur space heritage and museums; content analysis of policy documents, historical and documentary accounts, photographs, museum websites, and multi-media digital environments from the Baikonur Cosmodrome and museums; and direct observation of sites including Baikonur city and the launchpads, the Baikonur Museum and the Museum of Baikonur Cosmodrome History.

Interviews with participants lasted approximately 30–45 min and were conducted both online via Zoom and in person at Baikonur when participants could not be reached via online means following ethical approval to ensure confidentiality and informed consent with participants. The vast majority of interviews were conducted in English but when needed some interviews were conducted in Kazakh and Russian with local tour operators, local historians and at Baikonur with government officials by one of the researchers who is native from Kazakhstan and fluent in both languages. A breakdown of tourism stakeholders and their characteristics is detailed in Tables 1 and 2.

Table 1. Breakdown of stakeholders for the study.

| Categories of tourism stakeholders | Number of semi-structured interviews |
|--|--------------------------------------|
| Operators selling Baikonur tours | 5 |
| Government officials | 6 |
| Local NGOs | 3 |
| Specialists of Baikonur and space heritage | |
| – Historians | 4 |
| – Space experts and journalists | 8 |
| Total tourism stakeholders | 26 |

Table 2. Demographic profile of stakeholders.

| Variable | Categories | Number | Frequency (valid%) |
|--------------------------|----------------|--------|--------------------|
| Gender | Male | 18 | 69 |
| | Female | 8 | 31 |
| Age | 30–40 | 7 | 27 |
| | 40–50 | 10 | 39 |
| | 50–60 | 4 | 15 |
| | >60 years | 5 | 19 |
| | | | |
| Employment status | Fulltime | 24 | 92 |
| | Homeworker | 1 | 4 |
| | Retired /Other | 1 | 4 |

The sample of interviewees consisted in: five local and international tour operators selling tours to Baikonur; three local NGOs specialised in the protection of Baikonur heritage including Ecomuseum Karaganda, «Avalon» Historico-Geographical Society and Public Foundation and Baikonur for Human Rights Kazakhstan; four international and local academic historians with expertise of space heritage; six governmental officials including two from the governmental agency *Kazakh Tourism* promoting tourism in Kazakhstan, the head of Entrepreneurship and Tourism department from Kyzylorda region, one official from the Department of Culture, Tourism and Sports of the Administration of the City of Baikonur, one special representative of the President of the Republic of Kazakhstan at the Baikonur Complex, and the head of Kazcosmos in Baikonur, the National Space Agency of the Republic of Kazakhstan. Finally, eight international specialists of Baikonur including space experts from the European Space Agency and journalists specialised in the space industry were interviewed.

Findings

Space heritage interpretation and governance at Baikonur

Since 1961 Baikonur has been closely associated with manned missions. As well as events in this field, the history of Baikonur is above all that of the Soviet Union's pioneering exploits in space (Walker, 2021) which also included disasters and tragedies (Villain, 1996). However, there is no global museum about the history of space in Kazakhstan, but two museums in Baikonur celebrating the military and space legacy, with mosaics and mural works (see Figure 3) emphasising the work of soldiers who built the military sites that enabled the creation of the Baikonur Cosmodrome.

Presently, the Baikonur museums offer a limited and controlled account of the space heritage while ignoring its environmental impacts. For a Kazakhstani historian of the Soviet space heritage, the long-standing official discourse of Soviet power over the space heritage makes visitors complicit of a glorified story about the achievements of the Soviet Union: for example, through the process of the museification of the image of Gagarin as a successful and powerful example of a state-controlled story celebrating the success of the space achievements during the Soviet Union. This control of information is further commented by a tour operator:

The contents of Baikonur museums are all still very traditional and what is highlighted in museum contents are mainly “positive” things; if tourists want to discuss other or more difficult topics then the guides will just go over those or skip the questions.



Figure 3. Early Soviet space industry inside the Museum of Baikonur Cosmodrome History.

Source: Raushan Mukhamejanova.

For a local NGO involved in the preservation of Baikonur heritage, the guided tours mainly use a predefined and standardised “template of narratives” of stories about Gagarin, success, and glory of the Soviet space age “but not much beyond that; it’s very kitsch”. One of the Kazakhstani historians and expert of space heritage stated that the museums reflected primarily “the atmosphere of science and the potential of space scientific achievements and advancements”, an old fashioned and “frozen in time” account of space heritage as represented during the Soviet Union. Particularly, little information about future developments of Baikonur beyond information given about the independence of Kazakhstan in 1991 was provided in Kazakh museums, as commented by a local historian:

Space heritage museum exhibitions in Kazakhstan are very old, out of date and not up to the standards of modern museums. They often only include “naïve” photographs and works of local painters, with very few “authentic” objects and memorabilia (apart from spacesuits and personal belongings of cosmonauts).

Overcoming geopolitical tensions between Russia and Kazakhstan

Power asymmetries in the management of the site between Russia and Kazakhstan are prevalent at Baikonur Cosmodrome. The official access permits to visit Baikonur includes the condition that specific locations (hotel, guided bus tours) must not be left during visits under any circumstances. These security measures mean that Baikonur is still a Russian enclave, a territory leased by Russia from Kazakhstan until 2050 (Schreiber, 2008). As a local historian of Kazakhstani heritage detailed:

According to historians of the Soviet space era, the first 30 years of the development of space technology and science was a period when the narratives about the history of space was mainly about the developments of the Soviet space programs. After the collapse of the USSR, we tried to understand in what context Kazakhstan is “talking” about space. The military who operated the site during the Soviet Union, when they remember and talk about space, it is always in a colonial style, as if Kazakhstan did not exist. The role of Kazakhstan

in space history is very local. There is a form of negative attitude towards the local population —ironic, sometimes chauvinistic, and even aggressive. Military considered themselves as “soldiers of space”. Because they were on a mission, because they were on the side of all mankind. There is this accepted narrative by military that you must love astronauts, you must admire them.

Baikonur has always been closely involved in civilian and military space activity as well as ballistic missile development which explains “the large military presence at the site which in fact was run by a Russian Defence Ministry structure, the Military Space Forces” (Villain, 1996, p. 134). During the USSR at its peak in space exploration, Soviets preferred space nationalism policy over cooperation. As detailed by an employee of a Kazakhstani NGO, Kazakhstan is being overlooked by Russia in the contents of Baikonur museums in which it is clearly stated it is a Russian military site and Kazakhstan should be “thankful” to be able to share the ownership and use of this particular site:

The story conveyed at Baikonur is part of the Soviet heritage, but broadly limited to the Russian side of the Soviet Union; very little information is provided about the Kazakhstani people and their contribution to the making of Baikonur. It may not be intentional, as Kazakhstani guides also do not specifically mention about the Kazakhstani contribution to the site during the guided tours. Guided tours only portray a partial picture of the Kazakhstani side of Baikonur, with no information about the Kazakhstani-Russian relationships such as the lease of the territory to Russia.

One of the Kazakhstani officials from *Kazakh Tourism* additionally acknowledged:

The museums at Baikonur are more about the glorious days of the space exploration. There is not so much information about Kazakhstan compared to information about Russia. For this Kazakhstani governmental official, this is mainly due to the site being a Russian enclave leased to Kazakhstan until 2050:

Most parts of Baikonur are still under lease and under the regulations of the Russian Federation. In terms of heritage, the Russian Federation is the only stakeholder there, the Kazakhstani part doesn't play any crucial role and we don't have much voice in the management of the site.

For some stakeholders interviewed including local environmental NGOs and tour operators, the fact that Baikonur is still a military site operated on lease by the Russian Federation reinforces the perception that the site is controlled by the Russian security forces, making the visits “cumbersome, time-consuming, and not very convenient”. The future of the sight upon the lease by Russia is also commented by a local historian and space expert as being problematic:

How to make Baikonur “ours”? How can tourism help to deal with the development of the site in the future? Because all museums, in fact, “fix” the past but also need to make a projection into the future, and this is inevitable. It is very difficult to look at an exhibition of various space technical achievements, if at the same time you know that in the present there is no industry anymore, there is no longer any future developments. Baikonur is such a sad site; it really looks like a graveyard.

This feeling of a space heritage “frozen in time” poses questions of accountability of the Kazakhstani government for the future development and interpretation of collections and narratives in the museums so as to foster a more balanced view of contemporary heritage practices on sites.

This selective interpretation (Wight & Lennon, 2007) of the space heritage through the glorification of the Soviet space odyssey in the museum contents was contrasted in the celebrations of the 60th anniversary of Gagarin's flight from Baikonur (Suleimenov, 2021) and is relayed through the official historical and documentary exhibition "Baikonyr Gharysh Aylagy—Star Starts of Baikonur" of the national archive state agency in the capital city Astana (Archive of the President of the Republic of Kazakhstan, 2021). As part of the celebration of the 30th anniversary of Kazakhstani independence, the exhibition showcased for the first time a number of documents and photographs highlighting the history of the Baikonur Cosmodrome and key events linked to the Kazakhstani part of the history of cosmonautics. A Kazakh cosmonaut, Tokhtar Aubakirov flew to space under the Soviet space programme in 1991, precisely 30 years after the Gagarin flight. He was then followed by Talgat Musabayev (now the Chairman of Kazcosmos), who was trained as a cosmonaut during the Soviet Union times and flew to space in 1994. Through these celebrations uncovering rare footage, the Kazakhstani legacy of the space heritage is re-emphasised and officially recognised.

Among contemporary heritage interpretation practices, one Kazakhstani historian confirmed the celebration of Kazakhstani cosmonauts in this commemoration helped to primarily reinforce a narrative focused on the independence of Kazakhstan:

The state speaks about space in only one way, with photographs of Nazarbayev and local Kazakhstani cosmonaut. Independence began in space. Everything mentioned in our museums about space is always connected to the Kazakhstani independence ... About how lucky we are that Tokhtar Aubakirov managed to take off as a Soviet citizen and then became a Kazakhstani cosmonaut.

This new angle of interpretation of space heritage provided by the Kazakhstani government contributes to legitimate the importance of Kazakhstan in the management and presence of the site.

Space heritage interpretation, governance, and environmental issues

Space travel is not highly regarded within large parts of the sustainable development industry as it represents a "technological solution" and a "waste of resources". This antagonism between space and sustainable development needs to be overcome as low-cost access to space driven by space tourism could contribute to sustainable development for the Kyzylorda region. As Schreiber (2008, p. 317) details, some major environmental impacts from the rocket launches can be witnessed at Baikonur and surrounding areas:

Overnight changes in the weather, however, create food for thought. Many inhabitants of the areas to the southeast and east of Baikonur claim that the rocket launches trigger storms over the steppe, and the rocket stages fall dramatically onto the steppe and hit the ground in completely random manner, often close to settlements. A path of discarded rocket parts, contaminated with rocket fuel, stretches as far as the Altai. Physicians note high levels of disease, and there are frequent protests from the population. The government of Kazakhstan has requested that Russia thinks about non contaminated fuel.

Steen (2008, pp. 321–322) further details:

Small piles of rusting material are scattered among the pale reddish mud and green scrubland of the cosmodrome. It's not that the Soviet space programme was particularly

haphazard; it's just there was no obvious need to keep the vast territory tidy. There are large swathes of the cosmodrome where time has stood still, leaving nothing but long-abandoned Soviet-era projects and empty missiles silos.

Large pieces of space junk (such as pieces of a “proton”, descents cabins that were used for training or for real space flights) can be found in “alternative” museums such as the ecological museum in Karaganda (Figure 4) or in some private museums across the country; with the officially sanctioned state museums in Baikonur not showcasing any of these objects nor discussing the environmental impacts of space launches on the environment.

As one of the local NGOs and main expert in the environmental impact of Baikonur further explained:

The environmental degradation of Baikonur and its surrounding is an example of “the level of care” of Russia about Kazakhstan. There is very little about the environmental impacts of rocket launches in the museums. Only one or two posters mention that all environmental impacts were assessed, and that the situation is “normal”. It is a crucial time now for the remediation of historical buildings in Baikonur. And we ask Roscosmos to show such places. A lot of places in Baikonur are still not remediated but include very important sites where ballistic missiles were located.

For a number of stakeholders interviewed including local NGOs and tour operators, Kazakhstani and Russian authorities managing the site are not really interested to relay the sustainability issues at Baikonur, especially the environmental impacts of rocket launches that they would rather hide. As one local environmental NGO detailed:

The official communication about the environmental impacts at Baikonur by the head of Roscosmos and the Kazakhstani state is the same. For them, all activity at Baikonur is going according to the requirements of Kazakhstani environmental regulation. No one is interested to recollect evidence from the environmental impacts of rocket wreckages and fuel.



Figure 4. Space Junk at Ecomuseum Karaganda.

Source: Peter Hohenhaus of dark.tourism.com.

Another local NGO coordinator additionally emphasised:

There is still such an old Soviet perception of the environment in Kazakhstan, such as humans being “masters” of the natural environment.

For governmental officials such as *Kazakh Tourism*, the lack of care for the environmental impacts of rockets is inherited from the Soviet Union times:

During the Soviet Union there was no discourse at all about environmental issues and therefore this is probably why it is not in the agenda up until now. It is a long-term political project where environmental issues are downplayed, only some eco-activists keep raising this issue

For an employee of an environmental NGO collecting rocket debris, a form of “Baikonur phobia” or “environmental phobia” (Kopack, 2019), related to the environmental impacts of the site on the surrounding environments is commented as having an important impact on the perception of local communities surrounding the site:

Geographically, the communication about the environmental impact of rocket launches is limited to where the first stages of the rocket fall, not the impacts of the whole trajectory of the rocket traversing Kazakhstan. A company is contracted by Roscosmos to clean a couple of hectares around the launchpads, and nobody knows about such remediation activity ... It’s very fertile ground to various types of phobias from the local populations.

This “Baikonur phobia” participates to the need of informing the local populations surrounding the launch sites, as commented by a local expert of space undertaking research on the environmental impacts of Baikonur:

It is necessary to organise educational tours about the environmental impacts of Baikonur. To do this, it is very important to interact with the local population, to explain to them what is happening around the launch sites. If you say that it is not harmful, then just inform people in a simple way. The information conveyed about the environmental impacts should not be complex, such as the traditional lists of chemical formulas found in official reports. Not every local person, based on their level of education, can understand this. It can be presented informatively by an employee from the Department of Ecology. This is not about propaganda, but about making the population aware of the real environmental issues at stake.

A local expert of space undertaking research on the environmental impacts of Baikonur further added:

This is of course a political issue. This will all depend on the government. We can conduct research as scientists to improve the lives of local communities surrounding the site, not to warn, but simply to talk about what the environmental impacts really are, and of course the associated issues that need to be raised. In that regard, addressing these issues through tourism will also lead to the better well-being of these communities, and to the development of sustainable tourism activities in general.

Officially, the impact of rocket launches on the ecology is explained by the joint Baikonur governance as having minimum impact on the environment, while the local communities and perceptions outline a very different narrative, as one of the local tour operators explained:

The official statement constantly given at the cosmodrome is that there is very minimum harm on people and the environment. That “Soyuz” flies on kerosene and oxygen, which is

not harmful as airplanes are also flying on it. “Proton” flies on heptyl. Heptyl is harmful if it gets on human skin, the person can die. If heptyl gets on the grass, the grass dies too. If the heptyl fall on the ground, it is weathered in a few seconds. That means that heptyl does not leave any impacts on the environment—But local people tell very different stories—they can have hair loss, teeth loss, and that the weather always worsens after very rocket launches.

This view is emphasised by the Head of the Department of the Baikonur Cosmodrome of Kazcosmos who opened in 2001 the “Garysh Ecology Research Center”, the only Kazakhstani organisation that deals with space ecology:

Each launch is fully checked, before and after launch, we also check areas of impacts. We rely on their results. We have environmental support both from the Russian and from the Kazakhstani sides. This organization belongs to us. Its reports go both to us and to the Ministry of Energy (formerly the Ministry of Environmental Protection).

However, this apparent transparency is denied by one of the main environmental NGOs who is aware of the main issues regarding the environmental protection of the site. For him, all complying requirements need to have the approval of Russia to be able to investigate the issues further, as according to the intergovernmental agreement on the lease of the Baikonur complex, environmental services of Kazakhstan are not allowed at the Baikonur Cosmodrome.

Multi-stakeholder roles in space heritage preservation and development

A key theme emphasised by tourism stakeholders was the importance of Baikonur for its global significance for humankind, despite its military use and the “dark” history of aerospace technology linked to forced labour and human catastrophes, which will need to be documented and communicated transparently in the future (UNESCO, 2017a). Preserving tangible and intangible assets through the commodification of the Soviet space heritage in Baikonur necessitates a multi-stakeholder approach to the conservation of the site (Sharpley & Stone, 2009). As one of the local NGOs and director of Ecomuseum Karaganda commented:

In an ideal situation all stakeholders could be involved because each stakeholder exists in its very special narrow role that is impossible to fulfil by other stakeholders. Some key stakeholders are crucial: the first and most important would be the Kazakhstani government. We found some remains of Soviet moon rockets and we asked the government to list them as historical monuments. But nobody cooperates with us. We tried to list some historical buildings in Karaganda such as hotel “Tchaika” where the first woman in space Valentina Terechkova slept before her flight, but we have never been successful. These buildings are “authentic” but nothing inside of these buildings was preserved. A lot of visitors would have been potentially interested to visit these buildings and historical places.

However, for governmental officials such as *Kazakh Tourism*, the first step to protect heritage at Baikonur is to preserve existing assets and built heritage first before tourist facilities around the sites can be built:

The government should put heritage at Baikonur under specific regulations bot from the environmental perspective, but also from the community development perspective. The development of the site for tourism should be secondary.

In a similar vein, for the director of a local environmental NGO, all these objects and buildings must be “properly inventoried and then restored very carefully by heritage professionals” before being presented to tourists, embodying both the technological and socio-cultural aspects. As one international historian highlighted:

I think there could be two levels of how Baikonur can be “sanctified”, one is the science and technology, and the second would be about the everyday lives that citizens had at Baikonur during Soviet times.

However, for a Russian expert of space heritage, the “frozen in time” heritage of the Soviet past needs to co-exist with the living heritage at Baikonur:

We need to preserve Baikonur heritage as a living place. Living heritage, yes, as the site is still in operation. When I go there it’s like a “time machine” that allows me to travel into the past, I have the same feeling as when I was young. It feels like the place is frozen in time.

However, this heritage interpretation and preservation mainly focuses on the Soviet past without acknowledging the role of local communities living in and outside of the site.

Local community involvement in heritage interpretation and development

Whether the impact of the environmental pollution or the space heritage information displayed at museums, the involvement of local communities in the commemoration and delivery of Baikonur heritage is commented by a majority of stakeholders as being minimal, as one local tour operator commented:

When trying to understand how the cosmodrome relates to the cultural landscape, we discovered that for the local population of the territories surrounding Baikonur, the spaceport is of no value at all and that they know nothing about the cosmodrome. At Baikonur museums there is no information about how the local population interacted with the site; there are lots of stories about colonels, generals, important military officials and officers who were good builders.

One of the members of the national governmental agency *Kazakh Tourism* further advocated:

This is a very interesting point, because most of the tourism development now involves local communities, and, as far as I know, there is almost nothing like that at Baikonur. Involving local communities at every stage of the interaction with visitors would be a great idea.

For the director of the NGO Ecomuseum Karaganda, educational tourism for developing an awareness of environmental issues is seen as a prospective new form of tourism at Baikonur:

At the tour operator *Nomadic Travel Kazakhstan*, we used educational tourism to convey some specific considerations and ideas about sustainable tourism and it can be done again for space heritage development. This form of tourism will be essential to help understand and preserve the real value of Baikonur and its important history, whether linked to technological achievements or its “darker” side with human and environmental disasters.

As a tour operator advocated, aiming for local input and tailor an experience to locals and have children involved in the story telling of Baikonur would be important:

What should be put forward is this exceptional story of Baikonur in relation to the development of humankind during which the historical powers under communism and capitalism collided, competing for the space race. Baikonur is a crucial historical place and at the same time combined with personal dramas and tragedies; with local populations who still haven't had any immediate benefits from this site and space exploration. The local communities' stories are never mentioned during any tours of Baikonur.

Developing Baikonur space heritage on the locals' term could be a way forward to enhance authentic local stories and for its long-term viability. As one local tour operator detailed, Baikonur history should be conveyed not only for local citizens, "but for the younger generations that will aim to visit this place".

Discussion and conclusions

This study seeks to advance understandings of interpretation of space heritage for heritage preservation and sustainable tourism development in a unique and historical terrestrial space destination of the former Soviet Union. While there is emerging research on heritage and sustainable tourism development in Kazakhstan (Tiberghien, 2019), there is a lack of understanding of stakeholder heritage interpretation and management for tourism development. In what enfolds, space heritage interpretation and tourism development is discussed along the cultural and environmental dimensions.

Heritage tourism planning and development at Baikonur

This research presents a unique case study where questions of governance in post-Soviet Kazakhstan and the lack of consideration of the environment in heritage interpretation are important issues needing attention. At present, Baikonur is commented to be mainly driven by the Russian side of its administration, whether its interpretation of the Soviet space heritage or its impacts on the environment. Similar to studies that considered selective interpretation of the Soviet past (Lennon & Tiberghien, 2020; Werner & Purvis-Roberts, 2005; Wight & Lennon, 2007), contents that are presented at Baikonur museums and during the guided tours are partial when it comes to issues of the Soviet government's culpability in regard to the management of the impacts on the environment of rocket launches.

Among the various stakeholders involved in the management and development of tourism at Baikonur, the government is perceived as having a key role in the approach to policymaking of heritage tourism development that factors in and considers the environmental impacts of rocket launches. Alongside built heritage preservation and memorabilia presented, local tour operators emphasised that tourism development should come along the development of heritage interpretation in the museums of the environmental consequences of rocket fuel dispersals on the environment and communities surrounding Baikonur. In that respect, it may be necessary to consider future interpretation work at the Baikonur museums that uncovers transparently the environmental consequences on the environment and explain to local and international visitors how these issues could be addressed.

The management mechanism at Baikonur bears the question of the extent to which Russia can consider Kazakhstan as an equal partner for the mitigation of environmental

impacts and associated sustainable tourism development under the current lease agreement. As means to develop its visitation in the future, Kazakhstan will need to reinforce its institutional governance of its space heritage following the legacy of the Soviet Union; with the aim to be treated as an equal participant in the governance and management of Baikonur. As Bekus (2022, p. 362) details, “collaboration with Russia in space development would allow Kazakhstan to claim its share in the Soviet space legacy rather than to distance itself from it; and could become an indicator of the country’s development status”. Although a complete stop of operations from the Baikonur spaceport would be desirable for the local population surrounding the site, the following of international environmental norms and regulations would be a way forward for all parties involved in the management of Baikonur including Russia and the Kazakhstani government (Galtsova, 2017) so as to keep and continue to develop space heritage tourism assets for local and international visitors.

A need for local communities’ content and involvement in space heritage interpretation and development

In this study, selective interpretation as described by Wight and Lennon (2007) is prevalent in the interpretation of Baikonur heritage which are lacking multiple stakeholders’ views on space heritage development in Kazakhstan; thus advocating for the need of an open and transparent historical perspective on interpretation and education. A key question that was raised in this study by a number of stakeholders including local NGOs and governmental officials is the capacity of the local communities surrounding Baikonur to be involved in the interpretation of heritage and whose space heritage is being preserved for tourism development. How should the local population surrounding Baikonur Cosmodrome, who has been suffering from the numerous environmental issues created by the launch of rockets in the region of Kyzylorda and beyond, be involved in the interpretation and development of the site?

The development of space heritage has become a means of economics to the community by using the authenticity of the industrial site to educate or optimally fulfil its mission (Prentice, 1993). The extent to which the practice of heritage tourism in Baikonur can contribute to environmental protection is discussed by a number of stakeholders in this study with an emphasis for the need to develop a form of educational tourism at the museums around the environmental issues of space launches. There is no standard formula for successful space heritage revitalisation; one of the approaches that can be taken by stakeholders is to include the local community (Jamal & Getz, 1995). In the case of Baikonur, there is a danger of community being excluded from space heritage tourism development due to its environmental impact. Similarly to Kourou and Woomera space infrastructures “where elitist modern imaginings of the future collide with local views of the value of their own heritage” (Gorman, 2007, p. 166), the past is not only situated in the tangible heritage being displayed but in the living local communities who are trying to affirm their contribution to the site against the monumental historical importance of Baikonur. From this perspective, the development of storytelling (Pfister, 2000) from communities could help preserve, promote understanding and celebrate a site’s complex social legacy, enabling local community participants to connect with, and celebrate their past.

A heritage tourism development that fails to generate enough support and endorsement from the community may find its interpretation of local heritage contested. For Baikonur, the question remains as to whether or not communities have a choice in the

preservation of their space heritage when business investment and tourist demand often carry more weight than local planning strategies. The extent to which Kazakhstani stakeholders managing the development of tourism but also the local communities surrounding the site perceive Baikonur as a heritage from the past versus as part of their daily lives is under question. Potentially, the stories of the witnesses and their families could guarantee a genuine and authentic space heritage tourism experience through “living” and oral stories, enabling to create a wider awareness and appreciation of Baikonur space heritage and its environmental impacts for local and international visitors.

Ensuring Baikonur heritage preservation and development

For Marov (2010, p. 236, 237), “space heritage is complex in terms of attributes of value as they produce various legacies and give rise to both tangible and intangible heritage”. Appreciation of space heritage in Kazakhstan requires a tourism policy capable of understanding and supporting the potential of space heritage tourism in the country. The preservation of the space architecture, buildings and traditions inherited from the Soviet Union of the world’s largest Cosmodrome, stretched over 85 km north–south and 125 km east–west could become a source of income with high potential (Schreiber, 2008). Baikonur needs to be included in the overall heritage tourism strategy of Kazakhstan with its space heritage recognised as a unique international space heritage destination not only within the former Soviet Union, but among other terrestrial space ports and destinations such as Cape Canaveral in the US (Spennemann, 2004), Woomera (Australia) and Kourou (French Guiana) (Gorman, 2007). In this respect, there is a need for tourism strategies to position Baikonur space heritage as an important new niche and authentic terrestrial space destination that includes its space heritage facilities, buildings, and memorabilia. A public-private partnership involving existing actors from both Russia and Kazakhstan directly policing the site (Roscosmos, Kazcosmos) and other important actors such as local environmental NGOs, international and local tour operators, and experts of space heritage may be the most efficient management model for a sustained regional economy in the region of Kyzylorda where Baikonur is located.

The role of the public sector in the preservation of space heritage thus becomes important. In the case of Baikonur, the first priority would be the creation of an inventory of important space facilities and buildings to strengthen the museum collections. As De Vorkin (2010, p. 229) advocates, “there is a need to consider archival records, or instruments best preserved in museums or for which *in situ* preservation would be needed in the long term”. Currently, a basic guideline for heritage planning and development for the various space heritage sites present at Baikonur is missing for the Kyzylorda region; the first priority being the creation of an inventory of important space facilities, objects, and buildings. Presently, the core tourism products such as the excursion to the Baikonur museums, the memorial houses of Korolev and Gagarin and the orbital spacecraft “Buran” are perceived as essential markers of the region space heritage. New conservation policies from the ministry of tourism and the governmental agency Kazakh Tourism (2019) aiming at preserving and restoring objects removed from the space programme objects (dynamic test stand, genuine copies of Buran and Tempest launch vehicles) are needed both at the regional and national levels.

In the case of Baikonur, heritage preservation need so be done in such a way that heritage legacies and evidence are holistically preserved and not selectively interpreted nor serving a particular political agenda (Timothy & Nyaupane, 2009). To manage tangible and intangible heritage values appropriately in a way that represents those who created the cultural landscape at space sites, “their significance must be assessed in a way that allows multivocality and potential conflicts of meaning to co-exist” (Gorman, 2005, p. 103). As a catalyst for the change of heritage interpretation at the museums, the question of sustainability in Baikonur tourism practices is seen as a means to increase awareness of environmental issues for both local and international visitors, as well as for local communities surrounding the sites. To be able to effectively do this would involve political willingness from the Kazakhstani government that would become the principal actor for space heritage preservation and sustainable tourism development, where both the Baikonur historical narrative and associated environmental issues would be considered transparently and for the benefit of the surrounding communities.

Further research at Baikonur could examine how the interpretation of the sustainability aspect of terrestrial space tourism may be developed alongside the environmental, socio-cultural and economic benefits so that it has a lasting impact for local communities and future space heritage tourism policy-making process. As the world’s first and largest operational spaceport for orbital and human launches, the future preservation, value, and development of Baikonur space heritage and its historical significance could benefit the development of international tourism to the area while advocating for true sustainable development principles for space heritage tourism.

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