

Law For Space Travel: Analysis of Fiqh in Space

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Abstract

The purpose of this research discussion paper is to understand the Islamic issues involved in Space Travel, which is a novel field. Hitherto, only limited research has been undertaken on how Muslim astronauts can maintain their Islam for a prolonged period away from the Earth. This paper will commence with an introduction to Islamic law (which includes the distinct term *fiqh*), before discussing the obligations of Muslims in space. Also discussed in this paper will be the *Maqasid*, or higher objectives, which provides an avenue for Muslim space travelers to maintain their Islam within the framework of the religion. The methodology used in this paper is based on research of existing literature, comments from previous Muslim astronauts as well as a review of Muslim law that pertains to travel. The finding of this paper sets out the application of Islamic Law for interstellar Space Travel and off-world colonisation. It discusses the relevant *ibadah* rulings (literally meaning religious rituals such as prayer, fasting, ablution, keeping halal, and death rites inter alia) and how these can be practically applied in the context of space travel. This paper also outlines the moral, legal and practical challenges faced by a Muslim undertaking Space Travel and discusses the relevant Islamic 'knowledge' that may assist in reconciling these issues. The term interstellar Space Travel and colonisation is used to refer to those activities that are performed away from the Earth, such as in the micro-gravity of space or on an off world colony i.e., Mars. This paper is unique from other published papers in the field as it contemplates off world habitation and not just a short-term sojourn into space. The research finding is that Islamic Law is able to adapt to the challenges of space by incorporating how early Muslims maintained their Islam while traveling long distances outside their home countries. This is an emerging area of study, so there is a dearth and scarcity of literature about Muslims in space written from a scholarly perspective. This paper intends to rectify this situation by providing a marker for other scholars and researchers to follow.

Keywords: *Space Travel, Islam, Fiqh, Ibadah, Maqasid*

Abstrak

Tujuan dari tulisan ini adalah untuk memahami isu-isu Islam yang terlibat dalam Space Travel, yang merupakan bidang novel. Sampai sekarang, hanya

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penelitian terbatas yang dilakukan tentang bagaimana astronot Muslim dapat mempertahankan Islam mereka untuk waktu yang lama dari Bumi. Artikel ini akan dimulai dengan pengantar hukum Islam (yang mencakup istilah fikih yang berbeda), sebelum membahas kewajiban umat Islam di luar angkasa. dalam artikel ini Juga dibahas adalah Maqasid, atau tujuan objectif, yang memberikan jalan bagi para penjelajah ruang angkasa Muslim untuk mempertahankan Islam mereka dalam kerangka agama. Metodologi yang digunakan dalam tulisan ini didasarkan pada penelitian literatur yang ada, komentar dari astronot Muslim sebelumnya serta tinjauan hukum Islam yang berkaitan dengan perjalanan. Temuan artikel ini menetapkan penerapan Hukum Islam untuk Perjalanan Antariksa antarbintang dan kolonisasi luar dunia. Ini membahas aturan ibadah yang relevan (secara harfiah berarti ritual keagamaan seperti sholat, puasa, wudhu, menjaga halal, dan ritual kematian antara lain) dan bagaimana ini dapat diterapkan secara praktis dalam konteks perjalanan luar angkasa. Artikel ini juga menguraikan tantangan moral, hukum, dan praktis yang dihadapi oleh seorang Muslim yang melakukan Perjalanan Luar Angkasa dan membahas 'pengetahuan' Islam yang relevan yang dapat membantu mendamaikan masalah-masalah ini. Istilah Perjalanan Antariksa dan kolonisasi antarbintang digunakan untuk merujuk pada aktivitas yang dilakukan jauh dari Bumi, seperti di mikro-gravitasi ruang angkasa atau di luar koloni dunia yaitu Mars. Artikel ini unik dari artikel lain yang diterbitkan di lapangan karena membahas tentang tempat tinggal dunia dan bukan hanya persinggahan jangka pendek ke luar angkasa. Temuan penelitian adalah bahwa Hukum Islam mampu beradaptasi dengan tantangan ruang dengan memasukkan bagaimana umat Islam awal mempertahankan keislamannya saat melakukan perjalanan jauh di luar negara asalnya. Ini adalah bidang studi yang sedang berkembang, jadi ada kelangkaan dan kelangkaan literatur tentang Muslim di ruang angkasa yang ditulis dari perspektif ilmiah. Artikel ini bermaksud untuk memperbaiki situasi ini dengan memberikan penanda untuk diikuti oleh para sarjana dan peneliti lainnya.

Keywords: *Space Travel, Islam, Fiqh, Worship, Maqasid*

INTRODUCTION

Sayyidina Ali ibn Abi Talib (k.w.) said:

“The man who possesses real knowledge is he who does not make man despair from the mercy of Allah and does not make them feel safe from Allah’s punishment and does not provide them with concessions in which lies disobedience to Allah. There is no goodness in worship which is devoid of knowledge. There is no goodness in knowledge without understanding and nor is there goodness in a recital (of the Qur’an) that is devoid of reflection”. (Abdullah, 2006).

This statement elegantly encapsulates that worship without knowledge is a hollow ritual. In examining the science of Islamic law (*fiqh*), in relation to Space Travel and colonisation (herein “Space Travel”) (Laldin, 2006, p. 3). This paper

will outline the moral, legal, and practical challenges faced by a Muslim undertaking Space Travel and discuss the relevant Islamic 'knowledge' that may assist in reconciling these issues. There is a gap in the literature as this is a growing field of study, but hitherto, only limited research has been undertaken on how Muslim astronauts can maintain their Islam for a prolonged period away from the Earth. This is a novel area of research, as very little has been written about this area, although there are some parallels as noted below regarding the Fiqh of Travel and Fiqh of Minorities.

This paper is unique from other published papers in the field (Lewis, 2013; Justo, 2007; Fein, 2008), as it contemplates offworld habitation, and not just a short-term sojourn into space. While the Fiqh of Travel, as espoused by the various Islamic Schools (*Mazhabs*) generally provide very good guidance on what is permissible regarding *ibadah*, most of these rulings are from an Earthly perspective, or contemplate a return back to the home locale. The *Fiqh* of the Minorities (*fiqh al-aqalliyat*) to some extent contemplates a long term or lifelong habitation in lands from away from the equatorial location of the majority Muslim states, it is also constrained, to a terrestrial outlook.

The terms Space Travel and colonisation are used to refer to those activities that are performed away from the Earth, such as in the microgravity of space or on an offworld colony (i.e. Mars or the Moon). This paper will commence with an introduction to Islamic law (which includes the distinct term *fiqh*), before discussing the obligations of a Muslim in space. This paper will then discuss the relevant *ibadah* rulings (literally meaning religious rituals such as prayer, fasting, ablution, and keeping halal) and how these may be practically applied in the context of Space Travel. Also discussed in this paper will be the *Maqasid*, or Higher Objectives which provides an avenue for the Muslim Space Traveler to maintain their Islam away from the Earth.

Given that a significant number of Muslims have been and may well be involved in Space Travel, there is a distinct need for religious guidance for Muslims, without compromising their religious beliefs. Knowledge is the key to empowering Muslims to fulfil their Islamic obligations during Space Travel. Empowered by that knowledge, there needs to be no contradictions in observing Islam while undertaking Space Travel, despite the extra-terrestrial challenges. As an aside, this issue is not unique to the Muslim Space Traveller, as even Jewish astronaut Professor Jeffrey Hoffman faced certain challenges as an observant Jew

while in space, namely eating kosher food, observing Chanukah rituals and using a menorah). Lewis (2013) states that Christian religious observances have been practiced by American astronauts including reading from the Book of Genesis to Buzz Aldrin taking Christian communion while on the surface of the Moon. This is an emerging area of study, so there is a dearth of literature about Muslims in space written from a scholarly perspective. This paper intends to rectify this situation by providing a marker for other scholars and researchers to follow. The methodology used in this paper is based on a qualitative analysis of the existing literature, comments from previous Muslim astronauts as well as a review of Muslim law that pertains to travel.

The research finding is that Islamic Law is able to adapt to the challenges of space, but incorporating how early Muslims maintained their Islam while travelling long distances outside their home countries, sometimes on a voyage of no return. This is a novel and groundbreaking area of research, so there is a scarcity of available literature about Muslims in space written from an academic angle. This paper intends to be a marker for other scholars and researchers to follow: a kind of pole star in the night. As mentioned above, this paper is unique from other published papers in the field (as it contemplates offworld habitation, and not just a short-term sojourn into space. While the *Fiqh of Travel*, as espoused by the various Islamic Schools (*Mazhabs*) generally provide very good guidance on what is permissible regarding *ibadah*, most of these rulings are from an Earthly perspective, or contemplate a return back to the home locale. The *Fiqh of the Minorities* to some extent contemplates a long term or lifelong habitation in lands from away from the equatorial location of the majority Muslim states, it is also constrained, to a terrestrial outlook.

This paper will be divided into distinct challenges of practicing Islam in space (i.e. prayer). It will then examine the experiences of previous Muslim astronauts and cosmonauts, and any pertinent observations. This paper will then discuss relevant issues concerning Islamic and Fiqh in relation to space, with an emphasis of the relevant Maqasid principles. Concluding this paper, practical guidance will be provided in respect practicing the *Fiqh of Al-Ibadah* in an offworld setting.

RESEARCH METHOD

The research methodology used in this paper is based on a qualitative analysis. It is based on the existing literature, comments from previous Muslim astronauts as well as a review of Muslim law that pertains to travel, much of which are general articles as opposed to an academic or scholarly analysis. The two more important documents that pertain to this paper are: 1) General Authority of Islamic and Endowment in the UAE (GAIAE) Fatwa; and 2) "A Guideline to performing *Ibadah* at the International Space Station (ISS)" (Angkasa, 2010; Jabatan Kemajuan Islam Malaysia, 2015). In the ISS Guideline, the Malaysian space agency Angkasa convened a conference of 150 Muslim scholars and scientists to discuss a Muslim astronaut's dilemma in space vis-a-vis their religious obligation. Space was referred to anything beyond the atmosphere of Earth (Angkasa, 2010). The online Oxford Dictionary defines atmosphere as "the mixture of gases that surrounds the earth" (Oxford Online Dictionary, 2023). So, Space is any environment beyond the Earth's atmosphere, being in orbit, a long stay mission in orbit, or colonisation of other planets or moons.

RESEARCH FINDING AND DISCUSSION

Distinct Challenges - Prayer in Space

There are distinct challenges between an Earth orbiting mission and an offworld colonisation project, which either contemplates a return to Earth or perhaps a voyage on no return. An orbiting space vehicle would orbit the Earth at least 16 times a day, at 17,400 miles per hour, potentially meaning 80 prayers in a 24 hour period (Gartner, 2007), with the Qibla (that is the direction of Kaaba in Mecca), potentially moving 180 degrees during the course of a single orbit in space (Justo, 2007). The relevant questions are where to face in terms of Qibla and when? An offworld colonisation would entail departing the Earth and its orbit, and habitation on an offworld celestial body, albeit permanently or long term.

Distinct Challenges - Fasting in Space

This is also compounded by the issues surrounding fasting during Ramadan, how is a fasting day calculated? The Islamic lunar calendar is times to the visibility of Earth's Moon, where sighting of the moon precipitates certain religious events i.e. fasting in Ramadan (Lewis, 2013) So what happens in an offworld colony (or the Moon itself!), where the Earth's Moon is not visible, and space communication from Earth regarding the sighting of the moon takes some

time due to the great distance of space? Some commentators state that astronomy is not an acceptable way for the religious duties, as “worshipping is linked to the sighting of the moon” (Islamweb, 2002). Citing Ibn Taymiyyah, these commentators issued a fatwa that stated, “All the Muslims are agreed that fasting, breaking the fast, and performing Hajj are all through the sighting of the moon. So, these forms of worship should not be done through calculations that are used by Romans, pagans, Persians”(Islamweb, 2002). However, this is a minority opinion, issued in 2002, which has been overtaken by time, technology, and progress in Space Travel, and similar to the GAIAE Fatwa noted below, also had the same flaws in logic and understanding, formulated by traditional scholars without a background in the sciences.

Distinct Challenges - Ablution in Space

The availability of water is another issue in the space environment, as Muslims are to be in state of ritual purity before prayer/worship and after certain activities such as sex. However, this is somewhat alleviated given the dispensation to perform dry ablution, which originated as a result of praying in the desert areas on Earth, as noted in the ISS Guideline (Angkasa, 2010; Jabatan Kemajuan Islam Malaysia, 2015).

Distinct Challenges - Colonisation way from Earth

The issue of an offworld colonisation, with the prospect of no return to Earth, that is a one-way trip (i.e. to Mars) has raised concerns amongst certain Muslim scholars like the General Authority of Islamic and Endowment in the UAE (GAIAE). In a 2014 fatwa, the GAIAE stated that a one way trip to Mars to set up a colony poses a real risk to life that could never be justified in Islam, being akin to suicide (Chowdhury, 2014). However, this fatwa was also criticized within Muslim circles, as being “without scientific knowledge”, and decision made by “traditionally learned older sheikhs without a science education” (Chowdhury, 2014). In fact, in the Qur’an, Muslims are told that “*Allah...imposed no difficulties on you in religion*” (Qur’an 22:78), and as noted below, early Muslims were great travellers of long voyages.

The experience of previous Muslim Astronauts & Cosmonauts

In Islamic history, many of the Prophets were travelers, travelling far outside their place of birth. From Prophet Moses (pbuh) born in Egypt and roaming across the Sinai, Prophet Abraham (pbuh) from Iraq to the Bakkah Valley in Arabia, Prophet Jesus (pbuh) travelling thru the wilderness and according to some even to India in his youth, to Prophet Muhammad (pbuh) travelling to Syria and throughout Arabia. Of the 500 or so humans that have gone to space, at least 11 have been Muslims (Rhude, 2018).

Prince Sultan bin Salman Al Saud was the first Muslim to travel into space in 1985, carrying a Qur'an from his mother (Maisah, 2023). Since then, there were a number of Muslim astronauts and cosmonauts who have spent time in space, some even spending 541 days in space, including a Muslim woman (Rhude, 2018). There was "no evidence that their religious practices impacted their travel in space" (Rhude, 2018). One of the more recent Muslim astronauts was Sheikh Muszaphar Shukor, an orthopedic surgeon from Malaysia (Shukor, 2009). His sojourn into space occurred in October 2007 and included a video of praying in space (*Fajr*), where he was affixed to an anchor point to stop him from floating away. Sheikh Muszaphar Shukor's trip was also the impetus for the creation of the ISS Guideline, which formulated an Islamic approach to Space Travel (Fischer, 2008).

The ISS Guideline states that travelling in space is encouraged according to Islam. It provides that the Muslim astronaut needs to observe traveling ethics which are: 1) to maintain their relationship with God; 2) observe peace with other beings; and 3) maintain sustainability of the space environment (Angkasa, 2010; Jabatan Kemajuan Islam Malaysia, 2015).

Islamic Law and Fiqh

In discussing the application Islamic law and *fiqh* to Space Travel, including the views of the respective *Mazhabs* (Islamic Schools of Law and Jurisprudence), it is important to outline the meaning of these concepts. Islam is distinct from other religions because of the fact that Muslims' worship practices require routine attention to the Earth's geography and astronomy (Lewis, 2013). Islamic law, generally, is derived from the following sources: the Holy Qur'an (the Muslim religious text considered to be the word of God, as unblemished by man), the *Sunna* (the normative legacy of Prophet Muhammad, of which Hadith is a vehicle. Hadiths are reports describing the words, actions or habits of

Prophet Muhammad) and his family (pbut) (Brown, 2009, p. 3)), *Ijma* (consensus of opinions amongst the learned scholars), and *Qiyas* (analogical reasoning) (Rahman, 1979, p. 69). Comprised of the interpretation of these principal sources via a process known as *fiqh*, the Islamic law (or *Shariah*) is a complete code of regulations for Muslims in all aspects of their lives; a canon of obligations (Laldin, 2006, p. 3). Thus, in addition to the Qur'an and the Sunna, the sources of Islamic international law include treaties made between Muslims, publicly issued orders to commanders in the field by the early Imams, and the opinions and interpretations of great Muslim jurists (Bennoune, 1994). Importantly, there is nothing to limit Islamic law and its application only to the Earth.

Mazhabs

Mazhabs are the major schools of legal thought in Islam and provide differing perspectives into the rulings from the Qur'an and Sunna. The formation of the Mazhabs, a crystallization of the accumulation of legal opinions, generally occurred in the major centers of Islam in 8-9th centuries (Rahman, 1979, p. 81). The differences between the schools' stem entirely from the different weights each attach to various Qur'anic verses, and the degree of validity they assign to various prophetic traditions (Alwee et al., 2006, p. 154). In matters concerning *fiqh*, the source of the Mazhab is an important factor in understanding the basis for that particular ruling. A brief explanation of the major schools of thought is therefore appropriate.

The Jafari school is the major school within Shi'a theology. Its founder was Imam Ja'far al-Sadiq (d.765), a direct descendent of the Prophet. Imam Ja'far taught both Imams Abu Hanifa and Malik ibn Anas, who were his faithful students (Wikipedia, 2023b). The Jafari school of thought utilizes *ijtihad* (independent reasoning) by adopting reasoned argumentation in finding the laws of Islam (Wikipedia, 2023a). The Jafari school is predominant across North and East Africa, the Middle East, Central Asia and to a greater extent in many common law countries. Abu Hanifa (d.767) founded the Hanafi school in Iraq and was favoured by the Abbasid Empire. The Hanafi school is characterized by the exercise of free opinion and was the object of 'bitter invectives' of proponents of Hadith, given its strenuous rejection of free opinion (Rahman, 1979, p. 82). This school is predominant in Western Asia, lower Egypt, and Pakistan and India.

Malik ibn Anas (d.795) founded the Maliki school in Medina. This school placed its reliance on the 'living tradition (*Sunna*) of Medina' (Wikipedia, 2023b). It also used Hadith to support this living tradition. Malik collected a body of legal traditions, which he compared with the living practice in Medina, and developed a system of juridical opinion called *al-Muwatta* (the levelled path) (Rahman, 1979, p. 82). The Maliki school holds sway in North and West Africa, including Upper Egypt.

Idris al-Shaf'i (d.809) was a pupil of Malik, who formulated the principles of Islamic jurisprudence where the verbal tradition was regarded as the sole vehicle of the Prophetic *Sunna* (Wikipedia, 2023b). In the Shaf'i school, Ijtihad or reasoning was discarded from the process of consensus in deriving legal opinion otherwise known as Ijma (Rahman, 1979, p. 82). This school is prevalent in Southeast Asia, namely Egypt, Yemen, Malaysia, Indonesia, Singapore, Philippines and Thailand.

The Hanbali school continued to push the al-Shaf'i's insistence on Hadith in law and was an orthodox opponent of the rationalist school and reasoning. Its founder, Ahmad ibn Hanbal (d.241), has been championed by 'puritanical movements in the Arabian Peninsula' such as the Wahabis (Rahman, 1979, p.82).

Fiqh

Fiqh is a robust juridical system rooted in the primary sources, analysed and applied by scholars to arrive at solutions to practical problems faced by Muslims (Rahman, 1979, p.82). Fiqh refers to 'knowledge of practical legal rulings derived from their specific evidence, as deduced from the Qur'an and Sunnah to cover specific situations not directly treated in the revealed sources (Abdalla, 2012). According to Professor Abdalla, unlike Shariah, fiqh is flexible and changes according to the circumstances under which it is applied (Abdalla, 2012). Muslims have agreed on the Shariah but not on the rulings of fiqh (Abdalla, 2012). Fiqh itself can be divided into two main categories:

Fiqh al-Ibadah (rituals)

Encompassing the rulings that govern the relationship between man and God. This category is divided into four sections pertaining to rulings on prayer (*solat*), fasting (*sawm*), *zakat* (the compulsory giving of a fixed portion of one's wealth to charity, generally to the poor and needy: agreed to be 2.5% of net assets

per annum), and *haji* (a religious duty expected to be carried out once in a person's life, which consists of the pilgrimage to Mecca to perform ritual obligations such as circumambulating the Kaaba). Relevant to Space Travel are the first two elements, particularly the requirement to observe prayers as well as fasting during Ramadan. According to Ramadan (2005, p. 145), this category is very detailed and precise, and 'only the text is to be relied upon for deciding what is allowed in terms of ritual practice'. The *hukum* (rulings) in relation to prayer detail the entire spectrum from the prerequisites of prayer through to what will invalidate prayer (Laldin, 2006, p. 9). The *hukum* in relation to fasting includes all the obligations of fasting in the month of Ramadan and other types of optional fasting, including restrictions on fasting (Laldin, 2009, p.9).

In respect to *zakat* and *haji*, it is possible to fulfill these requirements, namely by still paying *zakat* for wealth on Earth, with the requisite calculation on *nisab* (the minimum amount that a Muslim must have before being obliged to give *zakat*). This can be done on behalf of the Muslim Space Traveller by a trusted loved one, who has a power of attorney instrument over financial matters.

As for *Haji*, one of the pillars of Islam, which is the obligatory visit of a Muslim to the Kaaba, at a specific time in the Islamic year: within the first 10 days of the Islamic month of *Dhul Hijjah* (Omaar, 2020, p. 52). The pilgrim has the intention of worship (*ibadah*) and performs certain rites and rituals during *Haji*, once in their lifetime if they can afford it and are physically capable. In his lifetime, the Prophet (pbuh) performed the pilgrimage as a model for worshippers to follow. By participating in pilgrimage, Muslims are leaving behind their daily, material bonds and physically and spiritually returning to the epicentre of Islam (Omaar, 2020, p.52). It is a "voyage inwards to oneself and a way of getting closer to God" (Omaar, 2020, p.52). If the Space Traveller has not completed *Haji*, it is possible to delegate another person to perform *Haji* on that person's behalf (Darul Iftaa Jordan, 2022).

Fiqh al-mu'amalah (or al-adah)

Covers the rulings that govern the relationship between man and man, and other creatures of God. This part of Islamic law concerns how man should respect the rights of one another. This category is general and provides "guidance in a certain direction, rather than fixing a restricting framework".

Ramadan (2005, p.145) states that the scope of methodology in this area is “very wide when it comes to social affairs, which are limited only by the infrequent prohibitions found in scriptural sources”. Muslims must decide their commitment using their reason, intellect, freedom and “more broadly, their imagination” (Ramadan, 2005, p. 145).

Fiqh *al-aqalliyat*

While not a formal aspect of classical *al-adah*, *fiqh al-aqalliyat* (or Fiqh of the Minorities) was coined in response to the changing reality of the times, where Muslims minorities lived in a non-Muslim majority context. The former Mufti of Egypt, Sheikh Ali Gomaa (2012) states that the “spatial circumstances of these minority groups affords them, in many instances, exigent justifications compelling a mufti to issue a *fatwa* (legal verdict) that is contrary to the established opinion of his school of jurisprudence, contrary to the opinion he deems dominant due to its evidences, or contrary to the fatwas of other muftis in areas where Muslims are the majority”. Sheikh Ali Gomaa (2012) argues that the fiqh of the minorities can help Muslim minority communities integrate into their wider community “without any dissonance between the rulings of their faith and the exigencies of life and in a manner that precludes any distress, hardships or oppression” which are rejected by the Shariah. As proclaimed in the Holy Qur’an, “Allah doth not wish to place you in a difficulty” [Qur’an 5: 6] and “He Imposed no difficulties on you in religion” [Qur’an 22:78].

Thus, it is possible for a new Fiqh to be created, which is based perhaps on the fiqh of the traveller and fiqh *al-aqalliyat* in response to the changing reality of Space Travel, where Muslims are able to travel in space while adapting their practices to the offworld environment: the Fiqh of Space Travel.

Findings: Fiqh of the Muslim Space Traveller

Where would space fit into the classical scholarship which divided the world into three distinct spheres of territories, *dar al-Harb* (abode of war), *dar al-Islam* (abode of peace), and *dar al-Aman* (abode of safe conduct)? *Dar al-Harb* referred to the regions where Islam did not dominate, where divine will was not observed, and therefore where continuing strife was the norm. By contrast, *dar al-Islam* encompassed those dominions where Islam ruled, where submission to God was observed, and where peace and tranquility reigned (Gulam, 2006). The

position of the Muslim Space Traveller is challenging because they fall outside of this traditional terrestrial taxonomy between dar al-Islam and dar al-Harb, perhaps leaning towards dar al-Aman, given that space is part of an international treaty, entering into force in October 1967, and declaring amongst other things, “the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind” (Space Foundation Editorial Team, 2023).

Early Muslim jurists assumed that a Muslim sojourning or residing in non-Muslim territory could do so under an agreement of safe-conduct (*aman* or *dar al-Aman*), according to which a Muslim is promised protection, and in return, he or she promises not to take action that is detrimental to the host state and to obey the commands of the host state. All jurists agreed that a Muslim must abide by the terms of the *aman*. Consequently, a Muslim must not commit acts of treachery, betrayal, deceit or fraud, and may not violate the honor or property of non-Muslims. The existence of an explicit *aman* is irrelevant because it is implied by the grant of permission to reside or enter non-Muslim territory (Gulam, 2006, p.91). The condition for remaining in such places was that Muslims must be allowed to practice their religion freely (Delic, 2009). Paraphrasing Imam Dr Zijad Delic (2009), space cannot be conceived as dar al-Islam and inconceivably classed as *dar al-Harb*, as these legal concepts are “wholly irrelevant in the context of [space] and its citizens of Muslim faith”.

Agreeing to travel in space would constitute a covenant (*ahd*) held between the Space Travellers themselves and the space agency; one that guarantees security and peace (*sulh*) in exchange for certain obligations, such as obeying communal conduct conducive for all. Covenants and/or contracts between Space Travellers of the Muslim faith and others are considered sacred and binding in Islam. The rationales for *dar al-Aman* are two fold: 1) without the mutual fulfillment of communal shared rights and obligations, a given community would dissolve into chaos, and rampant injustices would destroy the fabric of peaceful human co-existence, making it impossible for people to live together as contributing members of that community; and 2) Islamic formative principles demand from Muslims that they faithfully abide by the contracts (promises) they make.

The Holy Qur’an commands the following regarding contracts, “*And fulfill every covenant. Verily, you will be held accountable with regard to the covenants*”

(Qur'an, 17:34). Additionally, God instructs believers, "*O you who believe! Fully discharge (the obligations arising through) contracts*" (Qur'an, 5:1). Those who are blessed in God's sight are "*...those who truly care for their trusts (left by others in their care) and their covenants*" (Qur'an, 23:8). Moreover, the Qur'an condemns those who break covenants, describing them as untrue to their faith: "*It is not the case that every time they make a covenant, some party among them throws it aside. Nay! The truth is most of them believe not.*" (Qur'an, 2:100).

Tariq Ramadan (2009, p. 164) states that Muslims have a duty to limit injustice and evil, contribute to solutions that improve the lives of fellow men, and work progressively towards these goals. All this is only possible with active participation.

Sheikh Ali Gomaa (2012b) cites a fundamental lesson from the early history of Islam to support his view that Muslims travel was a historical reality. The life of the nascent Muslim community and of Prophet Muhammad (pbuh) presents tangible examples for coexistence and living in harmony with others, referencing the Abyssinia scheme under which the early Muslims were forced to migrate to Abyssinia. In so doing, Sheikh Gomaa (2012b) notes that they applied one method that has been used by so many Prophets of Allah who preceded Prophet Muhammad (pbuh), such as migration.

Nafi (2004, p. 107) strongly asserts that the division of the world into three spheres is essentially derived directly from "the Byzantine division of the world into Byzantine, Latin and other, and not a textually derived principle, as many Muslims believe". This view of the world is outdated; the contemporary world is one world of *ahd* and peaceful coexistence.

The *Maqasid* of Space Travel

Muslims are familiar with life being sacred and the notion that the entire universe results in and supports human life, as a tenet of faith. Life is nothing short of a miracle, from the galactic stars to the smallest of living organisms, ordained by Allah (swt). Although Islam treats the life of all creatures as valuable, it gives greater honour to human life. Knowledge of these *Maqasid* of *Shariah*, that is the higher objectives, can certainly go a long way to relieving some of the doubts and confusion when reconciling Space Travel and Ibadah, and the Divine gifts and benefits of these Islamic principles.

Scholars generally divide *Maqasid* into two general categories: 1) higher objectives of the lawgiver; and 2) objectives of those accountable before the law. Like Imam al-Ghazali (d. 1111), Imam al-Shatibi (d. 1388) amongst others, concluded that the major objectives of Shariah are the preservation of religion/faith, human life, progeny, material wealth/ property and intellect/ human reason. Islamic law aims to preserve essential and other interests by preserving their existence and also protecting them from annihilation (Ramadan, 2009).

However, it is crucial how the *Maqasid* are identified and defined for Space Travel purposes, to delineate how the *Maqasid* are balanced among each other and when they conflict in a given case, to determine how they should be applied to such cases, and also to describe how they should be adapted for use in a non-Earthly setting (Padela, 2019). So what are these higher objectives that may have application to Space Travel? Here are a few uncontroversial key maxims:

1. Human life is sacred. The saving of one life is considered to be the same as saving the life of all of humanity. This means that if Space Travel affords the ability to save and progress humanity, effort ought to be made for this endeavour. However this must not endanger others or be reckless.
2. God does not burden a soul greater than what it can bear. The plain understanding behind this is that humans should not be overwhelmed by their circumstances. Instead they should use the experience to strive towards piety and be grateful (*shukr*) for all the gifts from Allah (swt). This is a fundamental principle in relation to acts of worship in space.
3. Necessity can temporarily remove a prohibition for as long as necessity is present. This means that those things which are clearly prohibited, can be made permissible, such as their use in medicine (i.e., alcohol) if there is no alternative, and only for the period of the necessity. Again, this fundamental principle has great application in relation to acts of worship in space.
4. When confronted with two evils, the lesser of the two evil is preferred. This is not better explained in the utility of organ transplant, especially as a superior religious alternative than choosing to die. This also means that when a Muslim is confronted with two different lawful choices, the easier option should be chosen, i.e. one that causes less hardship. This is also a fundamental principle in relation to acts of worship in space.

5. Everything in Islam is permissible unless otherwise proved otherwise by clear evidence. There is nothing within Islamic law that prohibits Space Travel and limits humanities endeavors to explore the environment.
6. Actions will be judged according to intentions. Intention plays a critical role with all matters. In fact, this maxim is the cornerstone for judging actions generally. Here, Space Travel is undertaken as a means of worship of Allah (swt) alone.

Fiqh of *Al-Ibadah* in an Offworld Setting

The main issues concerning Islamic religious ritual observance in Space Travel relate to prayer, fasting, and the consummation of halal food. In discussing these issues, the views of the Mazhabs will be examined, specifically those rulings which provide the greatest ease for Muslim Space Travellers.

Prayer (*Solat*)

In Islam, prayer means not only preparing for prayer but also the actual prayer itself. The times for prayer can be found in the annual prayer timetables issued by the peak Muslim bodies in any given jurisdiction, as well in various mobile phone applications such as iPray (Qibla Compass, 2013). Other matters that impact upon preparing for prayer includes direction, attire, state of purity or ablution, direction of *Qibla* (the Kaaba in Mecca) and place of prayer. Each of these will be dealt with in turn in relation to Space Travel.

In terms of dress for prayer, the direction of *Qibla* and the place of prayer, these matters can be readily dealt with. The minimum standard of dress for Muslim men is to cover the *aurat* (from the navel to the knees), which is from the navel to the knees. Generally this is not an issue with space attire, which is generally covering the whole body to preserve warmth. Covering the head is not a mandatory requirement for prayer (for males) (Perduas, 2000, p. 24). The direction of *Qibla* is easily dispensed with, such that Space Travellers can either pray in the direction where the space craft is heading or towards the general direction of Earth, from an offworld colony perspective (PERDUAS, 2000, p.5).

Given the whole earth is a considered a mosque in Islam (Jābir reported that, The Prophet (pbuh), said, *"I have been granted five things which were not granted to any one before me: and for me the earth has been made a mosque and a means of purification; therefore, if prayer overtakes any person of my community, he should say*

his prayers (wherever he is)...”), thus prayers may be offered anywhere, individually or in congregation, and accordingly no consecration of the mosque is necessary: accordingly the space vessel or space camp would fall under this general rule. The only caveat is that the ground ought to be clean. Prayers may be said even in a non-Muslim house of worship, if certain conditions are met (which have no idols and pictures see Ali, 1994). The Holy Qur’an states, “And to Allah belongs the east and the west. So wherever you [might] turn, there is the Face of Allah. Indeed, Allah is all-Encompassing and Knowing” [Qur’an 2:115].

Tayammum refers to the act of wiping one’s face and hands with ‘purifying dust’ in a specified manner when there is no or limited water to perform the ablution to attain ritual purity for prayer (al-Jaziri & Robers, 2009, p. 185). If water is available, then normal wudhu (ablution prior to prayer), ought to be undertaken. However, it is possible to perform a ‘smart wudhu’ and only wash the necessary parts of the body (i.e. face, arms, head, and feet), or even use wet wipes (PERDUAS, 2000, p.28). In addition, it is permissible to wipe over one’s space boots without even having to wash the feet. The conditions for this dispensation are that the boots must be put on while in a state of purity, the boots must be waterproof and reach up the ankles, and must be in good state of repair, and the duration of the wiping is one day and one night as a resident, and three days and three nights as a traveller (in accordance with the Shaf’i school) (PERDUAS, 2000, p.30).

It is obligatory for Muslims to pray 5 times a day (Kamaruzaman, 2009, p. 177), which should be performed at dawn (*Fajr*), noon (*Zuhr*), in the mid-afternoon (*Asr*), at sunset (*Magrib*) and at night (*Isha*). Islam allows the prayer to be performed in a position appropriate for a particular situation. Thus, if one cannot stand, one may pray sitting down, or even pray while lying down (PERDUAS, 2000, p.52). The advantages of this concession in prayers is manifested while in a confined space, such as in spacecraft or other type of vehicle. The performance of the physical postures of prayer have been laid out as follows: 1) If upright standing is not possible, then any standing posture; 2) Sitting: Bowing is by bringing down the chin closer to the knee or the prostrating place; 3) Lying down on the right side with body facing the direction of Qibla; 4) Lying flat; 5) Using the eyelid as an indicator of the changing of postures in prayer; 6) Imagining the sequence of prayer (Angkasa, 2010; al-Jaziri & Robers, 2009).

If a Muslim is unable to pray at the scheduled time, or misses a prayer, Islam allows for the shortening of prayer, so prayer is performed on time, which is known as the prayer of the traveller or *Qasar*, or to perform the *Jama*, which is to combine two prayers from different specified times. It is also possible to pray after the appointed time, that is *Qada*, but this should not be intentionally undertaken PERDUAS (2000, p.49) as the Holy Qur'an states, "*Indeed, prayer has been decreed upon the believers a decree of specified times.*" [Qur'an 4:103]. The Qur'an, the Sunna and the consensus of the Muslim community confirm the legitimacy of *Qasar* (al-Jaziri, 2009, p.627). The Noble Qur'an states: "*And when you travel throughout the land, there is no blame upon you for shortening the prayer, [especially] if you fear that those who disbelieve may disrupt [or attack] you.*" [Qur'an 4:101].

This verse indicates the imperative to shorten the prayer when in a combat state, analogous to unusual circumstances. However, only those prayers that consist of 4 rak'ats (cycles), namely *Zuhr*, *Asr*, and *Isha*, can be shortened to 2 rak'ats. One condition, which must be met for travellers, is the minimum distance that the person must travel: approximately 81 kilometers (al-Jaziri, 2009, p.628).

Jama, as mentioned, permits the combining of two consecutive prayers (namely *Zuhr* and *Asr*, *Magrib*, and *Isha*), by performing together at an earlier time or at the later time. *Fajr* is never combined with any other prayer. The basis for this dispensation is that Islam lays no undue burden on the faithful, thus allowing "ritual prayers to be performed at other than their originally designated times in situations where performing them on time would create hardship for the person concerned". The reasons and conditions associated with this ruling differ in detail amongst the Mazhabs (al-Jaziri, 2009, p.642).

The Friday noon prayer is known as *solat al-juma't* and is a congregational prayer, which is preceded by a sermon (Kamaruzaman, 2007, p.181). It is half the normal noon prayer, however if someone misses the Friday prayer for operational reasons, they must perform the normal length of the noon prayer (al-Jaziri, 2009, p.491). According to the Shaf'is, the Hanafis, and the Hanbalis, the Friday congregational prayer can validly be performed outdoors (al-Jaziri, 2009, p.509). The Hanafis permit the quorum for Friday congregational prayer to be three people, including the Imam, even if they do not all attend the sermon, which is the most flexible of the Mazhabs (al-Jaziri, 2009, p.510).

Like Muslims on Earth, where there are months of day and night, Muslims estimate their prayer times according to the nearest place where prayer times can be identified. In a space context, the launch-site on Earth may be the relevant point for Muslims to ascertain the prayer times, or alternatively, they can use the timings as promulgated in Mecca, where the Kaaba is located. In fact, Emirati astronaut Major Hazza Al Mansouri was advised by Dubai's Islamic Affairs Authority to follow the prayer timings adhered to in Mecca (Dajani, 2019). The Authority's advice stated that "Makkah as the land where the revelation [message of Islam] was inspired, takes precedent," and that "Space Travel does not absolve a Muslim of their mandatory prayers and fast during Ramadan" (Dajani, 2019).

Fasting (*Sawm*)

Fasting in Islam is a ritual obligation in the month of Ramadan, amongst other situations where fasting is mentioned. It is a pillar of Islam, and an individual obligation on every Muslim who is capable of fasting (al-Jaziri, 2009, p.727). The obligation to fast in Ramadan is explained in the Holy Qur'an:

"O ye who believe! Fasting is prescribed to you as it was prescribed to those before you, that ye may (learn) self-restraint ... Ramadan is the (month) in which was sent down the Qur'an, as a guide to mankind, also clear (Signs) for guidance and judgment (between right and wrong). So every one of you who is present (at his home) during that month should spend it in fasting ..." [Qur'an 4:183 and 185].

The precedent for Muslim Space Travellers is similar to that of Muslim travellers in general. They are afforded a dispensation from fasting, however, they must make it up when able. Additionally, those who are temporarily unable to fast must make up the missed days at another time or feed the poor with an average full meal or its equivalent value per person per day (PERDUAS, 2000, p.58).

Permissible (*Halal*)

Halal is an Arabic word meaning "lawful" or "permitted". It is the standard of conduct for Muslims, as prescribed in the Qur'an. The opposite of halal is haram, meaning "unlawful" or "prohibited". Halal and haram apply to all facets of life. They are commonly used to describe cosmetics, pharmaceuticals, food products, ingredients, and food preparation materials. Alcohol is

considered haram, as well as any pork products. All foods are generally considered halal except the following non-exhaustive list of haram foods: 1) Alcoholic drinks and intoxicants; 2) Any type of pig products including bacon, ham, salami, etc.; 3) Carnivorous animals, birds of prey, and certain other animals; 4) Foods contaminated with any of the above products (Islamic Council of Victoria, 2022).

The ISS Guideline provides a very simple sentence on halal food: “If there is doubt on whether the food served on ISS is halal or not, it is then permissible to eat the food on the basis of not to starve” (Angkasa, 2010). However, a person must only eat enough food that is not halal “to alleviate hunger when no other food other than the prohibited food is available”(PERDUAS, 2000, p.63).

This ISS Guideline would also seemingly deal with the issues concerning meat cells that are artificially grown. In this scenario, cells from a cow or sheep are nourished with amino acids and carbohydrates until muscle tissues form, bypassing the life cycle of the animal raised for meat (Clayton, 2022). There is nothing to suggest this space-grown meat is haram or at odds with the dietary edicts in the Qur’an, as long as the cells are sourced from halal animals (Clayton, 2022).

Death in Space

For Muslims, the ideal ritual upon death is to have the deceased undergo a cleansing bath, followed by enshrouding and burial while facing Mecca. Although a possibility in an offworld colony, in the context of Space Travel, this may not be feasible (Thompson, 2021). Aside from freezing the deceased until the return to Earth to delay the rigor mortis decomposition process, or consider burial offworld, the ISS Guideline suggests burial in space with a simple funeral process (Angkasa, 2010). This is similar to the situation of Muslim sailors being buried at sea.

CONCLUSION

The advantages of the findings set out in this paper are that it provides some guidance in a novel field of research. The disadvantages of this paper are that the lived experience of Muslim astronauts will actually provide experiential data on how Fiqh can develop to match the trajectory of ibadah in space. This paper does not presume to be the final guidance for Muslims travelling in space,

as there is every possibility to develop the research into this area. Space Travel as a field and a phenomena is still developing. Islam as a religion has many devices and reasoning in demarcating the “Islamic” content of Space Travel and in establishing the Islamic practice. It is a vibrant field: the application of Islamic principles and values to a changing technological, offworld environment. Simply put, Space Travel is another means of serving the Creator, and an extension of the early Muslim travellers, who travelled far outside Muslim lands such as Ibn Battuta (1369) and Ibn Fadlan (960) to name a few. As nicely captured by Professor Khaled Abou El-Fadl, (the):

Essentialist and dogmatic conclusions fail to capture the dynamics of Islamic jurisprudence. Islamic law frequently distinguishes between a moral rule and a legal rule, and the fact that Muslim jurists insist on the unity of all Muslims at the theological and moral level does not entail that all legal rules must follow accordingly. The divergence between the moral imperative and the legal rule points to the tensions that permeate a legal system that emanates from a universal theology (El Fadl, 1994, p. 171).

Prince Sultan Bin Salman Bin Abdulaziz Al Saud, the first Muslim in space concludes that Muslim Space Travellers are clearly able to reconcile multiple religious obligations while directly participating in Space Travel: keeping the faith is nothing out of the ordinary for a Muslim (Staff, 2011). The quest for an Islamic way of life ought not be conditioned upon living on Earth. Implicit in this refocusing of the Islamic extra-terrestrial worldview is an invitation for Muslim Space Travellers to adhere to Islamic commitments and injunctions and to uphold the values of their religion insofar as the situation allows: to enjoin good and forbid evil for all of humanity.

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