

PROBLEMS OF PRAYER TIME AND *QIBLA* DIRECTION IN OUTER SPACE

Muhamad Adib Abdul Haq

Pondok Pesantren Darul Khair, Tegal, Central Java - Indonesia

adibmuhamad47@gmail.com

Abstract

The sun's shadow and addressing the *Qibla*, measured by several available methods, can be used to determine the times of prayer for Muslims who are on Earth's surface. The question of how to identify the prayer times and the direction of the *Qibla* emerges when a Muslim is in space. The aim of this paper is to identify the *Qibla* direction and prayer times in outer space. This qualitative article is based on a literature study. According to some of the findings of the scholars' *ijtihad*, Muslim astronauts could fly to Cape Canaveral depending on where they last left the earth, or they could follow the Greenwich Time or the Mecca prayer timetable. There are four alternatives for *Qibla* direction according to *A Guideline for Performing Prayer at the International Space Station (ISS)*: addressing the earth, facing the projection of the Kaaba in the sky, approaching the earth, or facing everywhere.

Keywords: *prayer times; Qibla directions; space*

Abstrak

Bagi muslim yang berada di permukaan bumi, penentuan waktu salat dapat menggunakan bayangan Matahari dan menghadap kiblat diukur dengan berbagai metode yang ada. Pertanyaan muncul ketika seorang muslim berada di luar angkasa, bagaimana menentukan waktu salat dan arah kiblatnya? Artikel ini bertujuan untuk menentukan waktu salat dan arah kiblat di luar angkasa. Artikel ini bersifat kualitatif berbasis studi kepustakaan. Beberapa hasil ijtihad para ulama menyatakan bahwa para astronot muslim dapat mengikuti jadwal salat Mekkah, Cape Canaveral berdasarkan darimana astronot meninggalkan bumi terakhir kali, atau mengikuti jam *Greenwich*. Mengenai arah kiblat, *A Guideline of Performing Ibadah (worship) at the International Space Station (ISS)* memberikan empat pilihan; menghadap Ka'bah di bumi (yang akan bergerak relatif terhadap posisi ISS), menghadap proyeksi Ka'bah di langit, menghadap bumi, dan boleh menghadap ke mana saja.

Kata Kunci: *waktu salat; arah kiblat; luar angkasa*

A. Introduction

The relationship between prayer times and *Qibla* direction cannot be separated from each other. One of the conditions for a good prayer is to face the *Qibla*. As is known, prayer times for those on earth follow the sun's position by looking at the length of the shadow, indicating the time for prayer. The obligation to face the *Qibla* of a Muslim on Earth can be carried out almost perfectly because of the earth's gravity so that he can stand upright. Then what if someone is in an area that does not have gravity, like in outer space? How to pray and face the *Qibla*?

Although this was unprecedented in the past during the time of the Prophet and his companions, there are verses in the Qur'an that hint at the possibility of traveling through outer space. In the letter ash-Syūrā (42): 29 it is stated:

وَمِنْ آيَاتِهِ ۚ خَلَقَ السَّمُوتِ وَالْأَرْضِ وَمَا بَتَّ فِيهِمَا مِنْ دَابَّةٍ ۚ وَهُوَ عَلَىٰ جَمْعِهِمْ إِذَا يَشَاءُ قَدِيرٌ

“And among His signs is the creation of the heavens and the earth, and all living beings He dispersed throughout both. And He is Most Capable of bringing all together whenever He wills.” (al-Shūrā/42: 29)¹

The verse above explains that some signs of Allah's power are the creation of the heavens and the earth and the living creatures scattered between them. This statement confirms that there are beings outside the planet earth, namely those between the sky and the world. The living creatures were scattered everywhere. Thus, the expression that life exists only on earth is refuted.²

Since Allah revealed the Qur'an fourteen hundred years ago, humans have been able to fly through outer space. Not only passing, but humans can build a space station, which can be occupied for a long time. One of them is the International Space Station (ISS), a joint project from several countries.³

The space station is located around the earth at an altitude of 360 km, usually referred to as a low Earth orbit. The exact size varies by about a few kilometers due to atmospheric streaks and rebooting and an average loss of 100 meters per day. This station orbits the earth

¹ Kementerian Agama RI, *Tafsir Ilmi Penciptaan Jagad Raya dalam Prespektif Al-Qur'an dan Sains*, Jakarta : PT. Sinergi Pustaka Indonesia, 2012, 104.

² Kementerian Agama RI, *Tafsir Ilmi Penciptaan Jagad Raya dalam Prespektif Al-Qur'an dan Sains*, 105.

³ Ahmad Sarwat, *Waktu Shalat*, (Jakarta: Rumah Fiqih Publishing, 2018), 42-43.

for a period of 92 minutes. This station has circled the globe in just 1.5 hours / 90 minutes. So if we measure it in days, this station goes around the Earth 16 times. Its speed, measured from the earth's surface, reaches 28 thousand km/hour. So the crew inside the station will see the sun rise and set 16 times. With this abnormal time count, in 24 hours, a person can pray as much as 16×5 times = 80 times.⁴

The description above indicates extraterrestrial life. The Qur'an has explicitly informed this, so religiously, this fact is actual. The problem with this phenomenon is how does a Muslim know the time of prayer and the *Qibla* direction?

B. Method

This type of qualitative research describes the problem of prayer times and the direction of the *Qibla* in outer space. The method used in this study is based on library research by collecting data from books, journals, articles, and websites related to this research. The data analysis in this study is descriptive by presenting a complete picture of the problem of prayer times and *Qibla's* direction in outer space and how to solve them.

C. Result and Discussion

C.1 Prayer Times

According to language (*lughat*), *Salat* comes from the word *ala*, *yaşilu*, *asalatan*, which means prayer.⁵ *Salat* according to the term is a worship that contains words and deeds that begins with *takbiratul ihram* and ends with greetings, with certain conditions.⁶ As contained in the book of *Fiqh as-Sunnah* written by Sayyid Sabiq, the meaning of prayer is:

الصلاة عبادة تتضمن أقوالاً وأفعالاً مخصوصة، مفتوحة بتكبير الله تعالى، مختتمة بالتسليم.⁷

“Salat is worship that contains special words and deeds, which opens with takbir, and ends with greetings.”

The five daily prayers, known as *Ṣalah Maktūbah*, are timed for their implementation in the Qur'an and specified in the Hadiths.

⁴ Ibid., 43.

⁵ Ahmad Izzuddin, *Ilmu Falak Praktis: Metode Hisab Rukyat Praktis dan Solusi Permasalahannya*, (Semarang: PT. Pustaka Rizki Putra, 2012), 77.

⁶ Slamet Hambali, *Ilmu Falak 1: Penentuan Awal Waktu Salat & Arah Kiblat Seluruh Dunia*, (Semarang: Program Pascasarjana IAIN Walisongo Semarang, 2011), 107.

⁷ Sayyid Sabiq, *Fiqh as-Sunnah*, Juz I, (Beirut: Daar al-Kitab al-Arabiyyah, 1973), 70.

فَإِذَا قَضَيْتُمُ الصَّلَاةَ فَادْكُرُوا اللَّهَ فِيمَا وَفَعُودًا وَعَلَىٰ جُنُوبِكُمْ ۚ فَإِذَا اطْمَأْنَنْتُمْ فَأَقِيمُوا الصَّلَاةَ ۚ إِنَّ الصَّلَاةَ كَانَتْ عَلَى الْمُؤْمِنِينَ كِتَابًا مَّوْقُوتًا

"When the prayers are over, remember Allah—whether you are standing, sitting, or lying down. But when you are secure, establish regular prayers. Indeed, performing prayers is a duty on the believers at the appointed times". (Al-Nisā' [4]: 103)⁸

وَأَقِمِ الصَّلَاةَ طَرَفِي النَّهَارِ وَزُلْفَا مِمَّنِ اللَّيْلِ ۚ إِنَّ الْحَسَنَاتِ يُذْهِبْنَ أَلْسِيَّاتِ ۚ ذَلِكِ ذِكْرِي لِلذَّكِرِينَ

"And establish prayer at the two ends of the day and at the approach of the night. Indeed, good deeds do away with misdeeds. That is a reminder for those who remember." (Hūd [1]: 114)⁹

عن جابر ابن عبد الله رضي الله عنه قال : ان النبي صلى الله عليه وسلم – جاءه جبريل عليه السلام فقال له : قم فصله فصلى الظهر حتى زالت الشمس ثم جاءه العصر فقال : قم فصله فصلى العصر حين صار ظل كل شيء مثله ثم جاءه المغرب فقال : قم فصله فصلى المغرب حين وجبت الشمس ثم جاءه العشاء فقال : قم فصله فصلى العشاء حين غاب الشفق ثم جاءه الفجر فقال : قم فصله فصلى الفجر حين برق الفجر او قال سطع الفجر – ثم جاءه من الغد للظهر فقال : قم فصله فصلى الظهر حين صار ظل كل شيء مثله ثم جاءه العصر فقال : قم فصله فصلى العصر حين صار ظل كل شيء مثله ثم جاءه المغرب وقتا واحدا لم يزل عنه ثم جاءه العشاء حين ذهب نصف الليل او قال ثلث الليل فصلى العشاء ثم جاءه حين اسفر جدا فقال : قم فصله فصلى الفجر ثم قال ما بين هذين الوقتين وقت (رواه احمد والنسائي والترمذي)10

"Jābir Ibn 'Abdullāh said: Jibril, peace be upon him, came to the Prophet (ﷺ) when the sun had passed its zenith and said: 'Get up, O Muhammad, and pray Zuhr when the sun has passed its zenith.' Then he waited until a man's shadow was equal to his height. Then he came to him for 'Asr and said: 'Get up, O Muhammad, and pray 'Asr.' Then he waited until the sunset, then he came to him and said: 'Get up, O Muhammad, and pray Maghrib.' So he got up and prayed it when the sun had set. Then he waited until the twilight

⁸ Kementrian Agama RI, *Al-Qur'an dan Tafsirnya (Edisi yang disempurnakan)*, Jilid 2, (Jakarta: Widya Cahaya, 2015), 252-253.

⁹ Kementerian Agama RI Direktorat Jenderal Bimbingan Masyarakat Islam, *Al-Qur'an dan Terjemahnya*, (Bogor: Unit Percetakan Al-Qur'an, 2018), 50, 315.

¹⁰ Al-Hafiz Jalal al-Din as-Suyuthi, *Sunan an-Nasa'i*, (Beirut: Daar al-Kutub al-Alamiah, t.th.), 263.

disappeared, then he came to him and said: 'Get up, O Muhammad, and pray 'Isha'.' So he got up and prayed it. Then he came to him when dawn broke and said: 'Get up, O Muhammad, and pray.' So he got up and prayed Subh.' So he got up and prayed Subh. Then he came to him the next day when a man's shadow was equal to his height, and said: 'Get up, O Muhammad, and pray.' So he prayed Zuhr. Then Jibril came to him when a man's shadow was equal to twice his length and said: 'Get up, O Muhammad, and pray.' So he prayed 'Asr. Then he came to him for Maghrib when the sun set, at exactly the same time as the day before, and said: 'Get up, O Muhammad, and pray.' So he prayed Maghrib. Then he came to him for 'Isha' when the first third of the night had passed, and said: 'Get up and pray.' So he prayed 'Isha'. Then he came to him for Subh when it had become very bright, and said: 'Get up and pray.' So he prayed Subh. Then he said: 'The times of prayer one between those two (limits).'" (Aḥmad, *al-Nasā'ī* dan *al-Tirmīdhī*)

The most authentic hadith regarding prayer times is the hadith of Jabir from the Prophet SAW. And the Hadith of Jabir, in terms of time narrated by Atha ibn Abi Rabah, Amr ibn Dinnar, and Az-Zubair, is similar to the hadith of Wahab ibn Kaisan from Jabir from the Prophet SAW.¹¹

C.2 *Qibla* Directions

Etymologically, the word *Qibla* comes from the Arabic **قِبْلَة**, which is one of the masdars isimis from **قَبِلَ - يَقْبَلُ - قَبْلًا** which means facing the intended direction towards the Kaaba. According to Slamet Hambali, the *Qibla* direction is the closest direction to the Kaaba through the great circle of the earth. The circle of the earth's sphere through which the *Qibla* direction passes can be called the *Qibla* circle. A *Qibla* circle can be defined as a circle of the earth's sphere that passes through the axis or axis of the *Qibla*.¹²

Facing the *Qibla* is one of the pillars of prayer. Therefore, every Muslim must pay attention to this provision. The perfection of prayer depends on his knowledge of the *Qibla* direction.¹³ The obligatory law of facing the *Qibla* when praying is contained in the Al-Qur'an and al-Hadith. The scholars have also agreed on this obligation.

¹¹ Muhammad Hasbi ash Shiddieqy, *Mutiara Hadits 3 Shalat*, (Semarang: Pustaka Rizki Putra, 2003), 147.

¹² Slamet Hambali, *Ilmu Falak Arah Kiblat Setiap Saat*, (Yogyakarta: Pustaka Ilmu, 2003), 14.

¹³ Muh Rasywan Syarif, *Problematika Arah Kiblat dan Aplikasi Perhitungannya*, *Hunafa: Jurnal Studia Islamika*, Vol. 9, No. 2, Desember, 2012.

قَدْ نَرَى تَقَلُّبَ وَجْهِكَ فِي السَّمَاءِ فَلَنُوَلِّيَنَّكَ قِبْلَةً تَرْضَاهَا فَوَلِّ وَجْهَكَ شَطْرَ الْمَسْجِدِ الْحَرَامِ وَحَيْثُ مَا كُنْتُمْ فَوَلُّوا وُجُوهَكُمْ شَطْرَهُ وَإِنَّ الَّذِينَ أُوتُوا الْكِتَابَ لَيَعْلَمُونَ أَنَّهُ الْحَقُّ مِنْ رَبِّهِمْ وَمَا اللَّهُ بِغَفِيلٍ عَمَّا يَعْمَلُونَ

“We have certainly seen the turning of your face, [O Muḥammad], toward the heaven, and We will surely turn you to a Qiblah with which you will be pleased. So turn your face [i.e., yourself] toward al-Masjid al-Ḥarām. And wherever you [believers] are, turn your faces [i.e., yourselves] toward it [in prayer]. Indeed, those who have been given the Scripture [i.e., the Jews and the Christians] well know that it is the truth from their Lord. And Allah is not unaware of what they do.. (Al-Baqarah [2]: 144).¹⁴

In the view of the three schools of thought, namely Hanafi, Maliki, and Hambali, it is explained that for people praying who can see the Kaaba building, the Qibla for him is the Kaaba building (ain al-Kaaba). However, for people who cannot see the Kaaba, the Qibla is the direction of the Kaaba (jihāt al-Kaaba). It is built with the argument that in the second situation, what is required is to do what is capable of being done (*al-maḥdūr ‘alayh*), which in this case faces the Qibla with the Qibla direction. Meanwhile, according to the fiqh school of thought, facing the Kaaba physically is impossible (*ghayr al-maḥdūr ‘alayh*). At the same time, Allah wants convenience for His servants.

In the Shafii madhhab, there are two options in this Qibla issue. First, as narrated by Imam Muzanni, states the same as the opinion of the three madhhabs other than Shafi'i. Second, as Imam Nawawi said, what must be done is to face the Kaaba physically, both for those who are near and can see the Kaaba and those who cannot. However, those far from the Kaaba must have a strong dzan if he is facing the Kaaba building.¹⁵

C.3 Space

Outer space or *fadla'* is a vast expanse on earth or something that lies between the galaxy and the stars that cannot know for sure except Allah SWT. *Fadla'* also means a prominent place on earth. The word *fadla'* comes from the root word *fadla'* - *yafduz* - *fudzuwwan*.¹⁶

¹⁴ Kementrian Agama RI, *Al-Qur'an & Tafsirnya; Jilid 1*, (Jakarta: Widya Cahaya, 2015) 221.

¹⁵ Sayful Mujab, Kiblat dalam Perspektif Madzhab Madzhab Fiqh, *YUDISIA*, Vol.5, No.2, Desember 2014, 317-343.

¹⁶ Fadlolan Musyaffa' Mu'thi, *Studi Komparatif Antar Madzhab Fiqih: Shalat di Pesawat & Angkasa*, (Semarang: Syauqi Press, 2007), 73.

Human research and exploration of space directly began only a few years ago. Before that, humans could only put forward hypotheses. However, humans have distinguished between outer and inner space, which shows a relatively separating boundary between the two.¹⁷

Abū 'Alī al-Ḥasan Ibn Haytam (965 AD), famous in Europe with al-Hazen, explains that the thickness of the atmosphere is 16,090 m. Robert H, Baker Ph.D. explained that the thickness of the atmosphere was at least 500 miles, while A. Dasuki estimated that the thickness of the atmosphere was around 250 to 1000 km. Meanwhile, Thantowi Djauhari explained that the thick atmosphere ends at an altitude of 250 miles.¹⁸

Various opinions regarding the thickness of the atmosphere indicate that experts tend to their respective assumptions.¹⁹ According to Myron B. Gubitz, outer space relative to a person begins at an altitude of 65,000 feet, beyond this altitude there is only a sufficient quantity of oxygen or air pressure for survival without the use of protective equipment.²⁰

Humans, when moving on earth their bodies are subjected to constant air pressure on average of about 14.7 ritl per square inch (according to Torricelli's experiment, 1 kg per square cm or 4 kilograms per square inch) at an altitude of 0 meters above sea level. This pressure describes the balance of the earth's air that we feel. At 35,000 feet, oxygen becomes very low, insufficient for humans to breathe. When it exceeds an altitude of 60,000 or 65,000 feet, the liquid in humans and blood begins to boil. At the same time, gas bubbles in the blood evaporate, causing sudden death.²¹

C.4 The Problem of Prayer Times and *Qibla* Direction in Space

According to NASA data, up to 2021, there have been 11 Muslim astronauts who have gone into space, namely: Sultan bin Salman Al-Saud from Saudi Arabia in 1985, Muhammed Faris from Syria in 1987, Musa Manarov from Azerbaijan in 1987 & 1990, Abdul Ahad Mohmand from Afghanistan in 1988, Toktar Aubakirov from Kazakhstan in 1991, Talgat Musabayes from Kazakhstan in 1994, 1998 & 2001, Salizhan Sharipov from Russia in 1998

¹⁷ Abdurrachim, Al-Qur'an dan Ruang Angkasa, *Jurnal Al-Mawarid*, Edisi Kedua, September-November, 1993, 31-32.

¹⁸ Ibid., 32.

¹⁹ Ibid.

²⁰ Ibid.

²¹ Ibid.

& 2004, Anousheh Ansari from the United States of America in 2006, Sheikh Muszaphar Shukor from Malaysia in 2007, Aidyn Aimbetov from Kazakhstan in 2017, and Hazza Al-Mansoori from Abu Dhabi in 2019.²²

The craft travels 17,400 miles per hour in space, orbiting Earth 16 times a day. If you follow these calculations, astronauts must perform the obligatory prayers 80 times. Of course, religion will not be complicated. Based on the results of a conference of 150 Muslim scientists and scholars under the auspices of the Malaysian National Space Agency ANGKASA and the Department of Islamic Development, astronauts can attend the prayer times to launch their space missions. They still pray five times daily every 24 hours using time on earth.²³

In addition, if it is not possible for astronauts to stop working for prayers, they can shorten prayers (*qasar*) or combine (plural) prayer times. Before worship, a Muslim must perform a purification ritual by washing his face, hands, arms, legs, and hair with water. The water on the ISS is so precious that even recycling sweat and urine is necessary. So, Muslim astronauts can purify themselves using dust or *tayammum*, which is touching the palm of their hand to a wall or mirror and then rubbing it on the face, and back of the hand up to the elbow while reading the purification prayer.²⁴

The problem of prayer times and the direction of the *Qibla* in outer space, of course, there is no answer in the classical fiqh books because, at that time, it was completely unimaginable for humans to orbit the earth in such conditions. So the answer is the *ijtihad* of some contemporary scholars today.²⁵

Contemporary scholars agree that astronauts are still obliged to pray five times a day and night according to calculations on the earth's surface because it is impossible to pray five times in a duration of every 90 minutes or 80 times in 24 hours. Which country follows the time on the earth's surface if the prayer schedule follows the schedule?²⁶

²² <https://sains.sindonews.com/read/323886/767/11-astronot-muslim-yang-pernah-menggelar-riset-di-luar-angkasa-1612375326> diakses pada tanggal 26 Oktober 2022 pukul 15.20 WIB.

²³ <https://teknologi.id/insight/cara-astronaut-puasa-dan-salat-di-luar-angkasa-berbeda> diakses pada tanggal 26 Oktober 2022 pukul 16.00 WIB.

²⁴ Ibid.

²⁵ Ahmad Sarwat, *Waktu Shalat*, 44.

²⁶ Ibid., 45.

Meanwhile, in Ahmad Sarwat's book, there are three options regarding prayer times in space, including the following:²⁷

1. Follow Mecca Schedule

The most common opinion is that the prayer times for Muslim astronauts are based on the prayer times in the city of Mecca Al-Mukarramah. The reason is that the first time Allah ordered the five daily prayers (Isra' and Mi'raj), the Prophet was still in Mecca. When the prayer schedule becomes chaotic, it is returned to the program of Mecca.

2. Follow Cape Canaveral

There is also the opinion that the prayer schedule follows the prayer schedule in Cape Canaveral. The reason is based on where the astronaut left earth for the first time. Because they generally take off from Cape Canaveral in Florida, United States, the prayer schedule follows the last place where he died on the earth's surface.

3. Follow Greenwich

There is also a mention that the prayer schedule is based on Greenwich time. It is said that NASA uses a clock based on Greenwich to set a daily schedule, whether for work, eating, sleeping, resting, or other space flights. So that for Muslim astronauts, it will be much easier to follow the official schedule that applies.

Regarding the direction of *Qibla* in outer space in the manual issued from the conference of 150 Muslim scientists and scholars under the auspices of the Malaysian National Space Agency ANGKASA and the Department of Islamic Development entitled 'A Guideline of Performing Worship (worship) at the International Space Station (ISS).' First, facing the Kaaba on Earth (which will move relative to the position of the ISS). Second, facing the projection of the Kaaba in the sky. Third, facing the earth. Fourth, they can face anywhere.²⁸

Prayer movements in outer space also get relief. The reason is that prayer movements, such as standing, bowing, and prostration while wearing space clothes, will be challenging in conditions of zero gravity. The guide to worship in space simplifies this by mentioning that astronauts can pray to stand alone. If he can't stand, he can sit. If you cannot sit, please lie

²⁷ Ibid., 45-46.

²⁸ <https://teknologi.id/insight/cara-astronaut-puasa-dan-salat-di-luar-angkasa-berbeda> diakses pada tanggal 26 Oktober 2022 pukul 16.00 WIB.

down. Even if they cannot do all of that, astronauts are allowed to perform prayers by gestures with their eyelids or simply by imagining them.²⁹

D. Conclusion

Contemporary scholars agree that astronauts are still obliged to pray five times a day and night, according to calculations on the earth's surface. Because it is impossible to pray five times every 90 minutes or 80 times in 24 hours, some results of the *ijtihad* of scholars stated that Muslim astronauts could follow the Mecca and Cape Canaveral prayer schedules based on where the astronauts left the earth last time or Greenwich time. Regarding the direction of *Qibla* in outer space in the manual issued from the conference of 150 Muslim scientists and scholars under the auspices of the Malaysian National Space Agency ANGKASA and the Department of Islamic Development entitled 'A Guideline of Performing Worship (worship) at the International Space Station (ISS).' First, facing the Kaaba on Earth (which will move relative to the position of the ISS). Second, facing the projection of the Kaaba in the sky. Third, facing the earth. Fourth, they can face anywhere.

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²⁹ Ibid.

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