

## Prayer Time and Qibla Direction in Near-Earth Space

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### Abstract

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Prayer is an obligation for Muslims wherever they are. The time and direction of the Qibla where they are on the surface of the earth can be normally observed and determined using both projections and solar shadows. But an obstacle arises when a Muslim prays while in space near the earth, such as on the International Space Station or other space stations that exist today or in the future, so studies are needed to find a solution to this condition. The ijihad ulama expressed several opinions, such as using a reference time from the last place the Muslim astronaut left, or using the prayer schedule used in Mecca. While facing the Qibla direction, there are four optional references such as facing the Kaaba on Earth in the relative motion of the spacecraft, following the projection of the Kaaba, facing the Earth, and facing in all directions based on faith.

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## A. Introduction

Muslims are obliged to pray five times a day at a fixed time, even from before sunrise to after sunset, or from the time of the pre-dawn prayer to the Isya prayer. However, in a spacecraft such as the International Space Station (ISS) or any other space station, the prayer time becomes difficult to keep because the astronauts on the spacecraft experience high speed orbiting the Earth.

More than 600 people have travelled to space, either as astronauts or tourists [1]. Almost 2 per cent of them are Muslims, and the number of Muslim astronauts is expected to increase.

The current Muslim astronaut on the ISS is Sultan Al Neyadi, 41, from the United Arab Emirates (UAE). He joined the Crew 6 mission on SpaceX's Crew Dragon. The Muslim astronauts had to find the right time and navigate the Qibla direction to the Kaaba, especially during the five daily prayers.

On Earth, prayer times are determined by the position of the sun from the geographical location of the congregation [2]. The rules of prayer time and qibla direction become irrelevant and inapplicable in space.

Prayer time on the ISS was difficult because the ISS orbits the Earth at an altitude of 413 to 422 km [3] above the atmosphere. The spacecraft, which has been inhabited since 2000, travels at a speed of 27,600 km per hour, or 7.66 km per second, so it takes the ISS only 93 minutes to complete one orbit around the Earth. It orbits the Earth 15-16 times in 24 hours.

This means that astronauts on the ISS see the sun rise and set 15-16 times a day, which means potentially 80 prayers in 24 hours, with the Qibla potentially moving 180 degrees during a single orbit in space [4].

Knowledge that enables Muslims to fulfil their religious obligations during space travel. There should be no contradiction in observing Islamic prayers during space travel, despite the extraterrestrial challenges. As an aside, this issue is not unique to the Muslim space traveller.

The result of the research is that Islamic law can adapt to the challenges of space, but incorporate how early Muslims maintained their Islam while travelling long distances outside their homelands, sometimes on a voyage of no return.

The benefit that Sharia seeks to create is the essence of Sharia policy (Syas` syar`iyyah) in responding to social, political and economic dynamics. The concept of

mashlahah as one of the methods of approach in Islamic jurisprudence became indispensable to the development of the age, especially in the field of technology. Thus, the development of science and technology, especially the technology used in space exploration, should be based on the concept essence of the Shari'ah [5].

## **B. Research Methods**

The research methodology used in this paper was based on qualitative analysis. It was based on the previous literature, previous testimonies of Muslim astronauts and Shari'a reviews related to travel, many of which were general articles as opposed to academic analysis..

## **C. Result and Discussion**

The problem of prayer times and the direction of the qibla in outer space was not addressed in the classical fiqh books, because it was completely unthinkable at that time that human beings could orbit the earth in such conditions. So the answer today is the ijtiḥad of some contemporary scholars.

The procedure for praying in the spacecraft is similar to praying in an aeroplane or in a normal environment, but under emergency conditions due to illness or other obstacles. Apart from the constraints of prayer, astronauts can be categorised as travellers or people on a journey, who are given flexibility in fulfilling their obligations, such as combining the two times of prayer, dhuhur with asar and maghrib with isha.

### **Prayer Time in Spacecraft**

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 determined. In a space context, the launch site on Earth may be the relevant point for Muslims to determine prayer times, or they may use the times as announced in Mecca, where the Kaaba is located. Indeed, Emirati astronaut Major Hazza Al Mansouri was advised by Dubai's Islamic Affairs Department to follow the prayer times observed in Mecca [4].

Jabatan Kemajuan Islam Malaysia (Jakim) said prayers could be performed according to the time the spacecraft was launched. In the case of Muszaphar, he could use the prayer times in Kazakhstan as a guide. Meanwhile, Al Neyadi, who launched from the Kennedy

Space Center in Brevard County, Florida, USA, used a prayer schedule based on Florida time [6]<sup>1</sup>.

Contemporary scholars agree that prayer times for astronauts in space can refer to prayer times in Mecca, Cape Canaveral (launch site) and Greenwich time. Mecca prayer times can be used as a reference for astronauts because of their privilege as the first to receive the Prophet's orders to perform prayers. The reason for using Greenwich time is that NASA's daily schedule, including space flights, is based on Greenwich time [7].

### **Qibla Direction in Spacecraft**

In the interpretation of Ahkam, it is said that the Qur'an confirms that the condition for the validity of prayer is facing the Qibla, namely the Ka'bah, which is in the Masjid al-Haram, and it is not permissible for them to pray facing the Qibla, which is in accordance with what Allah has commanded in the Qur'an, except for those who are in the vehicle and for those who are in a state of fear (khauf) [8].

Imam Shafi'i explains in one of his narrations that the Qibla must face the Ka'bah, and the Ka'bah is in the Masjid al-Haram in Mecca. According to Muzani, Imam Shafi'i said that this applies to those who are inside the Masjid al-Haram, while those who are outside the Masjid al-Haram only follow the direction, not the building. Meanwhile, Imam Abu Hanifah and Imam Malik have the same opinion, which is enough to face the direction, not the building.

The problem of prayer in space and spacecraft shows that new problems have arisen and need an immediate solution, The author finds that for determining the prayer schedule, Muslim astronauts can estimate their prayer times according to the nearest place that can be identified. This solution gave them ease for the right time and duration of prayer and its shows that were not based on what happened in their "vehicle" and the phenomenon that occurred in their "vehicle" that flew orbiting the earth. The prayer schedule could be based on the nearest last base or where they took off from.

The difficulties of Qibla direction in spacecraft are solved with the following priorities:

1. By determining the physical direction of the Kaabah by calculation or any other method with high precision,

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<sup>1</sup> Jabatan Kemajuan Islam Malaysia, *Pelaksanaan Ibadah Di International Space Station, ISS (Stesen Angkasa Antarabangsa)* (Putrajaya: Jabatan Kemajuan Islam Malaysia, 2007) <<https://www.islam.gov.my/ms/garis-panduan/473-garis-panduan-pelaksanaan-ibadah-di-international-spacestation-iss-stesyen-angkasa-antarabangsa>>.

2. The estimates of the Kaabah direction or the projected Kaabah position in the sky, so that the astronauts in the spacecraft have the same "plane" and direction in the prayer movement.
3. Facing the direction of the Earth for ease, or
4. Any direction

Mathematical calculation methods can help to position the ISS and Mecca on the same imaginary plane by assuming that the Earth under the ISS is the Kaaba or projecting the Kaaba into space so that they can calculate the approximate position at any time. By doing this, the visual map could also be obtained to increase the truth of the Qibla direction is the spacecraft.

#### **D. Conclusion**

The development of conditions and situations of prayer for Muslims requires legal decisions. The solution to new problems that were not found in the past is an absolute necessity. If in the past there was no prayer problem in space, now it is a reality. This renewal is necessary so that the Sharia is always flexible for every situation. One of the efforts is to give *rukhsah* to the customs in space, a place and a phenomenon with no provisions in the texts and old *ijtihād*. It becomes a method to lighten the legal burden of Muslim astronauts like *Mukallaf* who are on a mission in space while still fulfilling their duties. So that Muslim scientists can continue to contribute to the development of science and technology.

The prayer schedule used for the astronauts is based on the launch site or they could use the Mecca prayer schedule. The difficulties of the Qibla direction in spacecraft are solved with the following (1) Kaaba, (2) Kaaba projection, (3) Earth, or (4) anywhere.

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