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History and Analysis of Knowledge in Islamization of Aerospace Engineering

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Abstract: The understanding of Muslim scientists can play an essential role in the efforts of the Islamization of knowledge. Unfortunately, all sciences, including today's engineering and technology, which flourished in the medieval era at Muslim scholars' hands, are mostly empty of Islamic attitude and spirit. Today's Muslim scientists are obliged by the Muslim Ummah to restore science's nature to Islam's soul. This paper concentrated, on studies, and analysis of the specific ideas in aerospace engineering. Also, the concept and creativity of the airplane through the bird concept have been highlighted and analyzed. The main objective is to make Qibla's concept during the flight journey to save time for salat and time fluctuation. The paper contents with specific plans should be further pursued, both academically and practically, in the process of Islamization of aerospace engineering.

Keywords: Islamization, aerospace engineering, airplanes, IOK, Qiblah, and Salat

Introduction: Islamization of science is included in engineering and technology. The Holy Quran has already had an example of each practical application and concept in science, technology, and daily life. The Islamic knowledge based on the Holy Quran has given a solution to each practice problem. Engineering is a major concern in everyday life. From top-level to the bottom level surrounding, we are connected to engineering and technology. From the view of Islamic knowledge, Islamic engineering, or studying engineering science from an Islamic perspective, is only the fact of the day. Muslims have made advancements in sciences and acquired the ability to describe them accurately. Various factors influenced this tendency towards Islamic technology. These include the role of religion and how Muslims understood it. During this period, the understanding of Islam was that of faith with cultural unity.

The state of science polity was supportive of the translation of manuscripts, the establishment of academics, observatories, and libraries, and the patronage of scientific and conducted scientific and technology research. Islam and Arabic knowledge were the two unifying forces of Islamic society. The state facilitated scientists and engineers to spend their quality time researching, inventing, and engineering writing. These early

engineers saw Islamic engineering as an enterprise that embodied Islam's values, moral rules, and religious practices. Today we must agree that without total spiritual, cultural, and material coordination, engineering techniques cannot be built. Engineering techniques have underlying philosophies. Muslim engineering should comprehend that dimensional orders and cosmological histories of humans are all dependent on man's framework of his inherent value norms.

These are parameter which advocates the rules of need, criteria of identity, and characteristics of activities. It is the same, which also shapes the profound cosmological structure of man's socio-political activities; actions that determine man's future and his place in the world are the same activities which choose human relation; and man's relation to cosmic nature. It is man's virtues that direct him to develop and cultivate distinct norms in science and technology. By all these, we mean that it is all about connectivity, worldview, and the sense of belonging and background. Muslim engineers are connected to a given culture with its norms and ethos.

What is needed today is a change of method and approach. Comprehension of the environment and circumstances under which the Muslim Ummah operates about studying engineering is essential to the summit of all points. Aerospace engineering investigates the object that flies in the air like aircraft and space shuttle. Aerospace engineering is the preliminary study of two fields of aeronautical and astronautical engineering. Besides, avionic engineering is also a part of this study; indeed, this deals more with electric systems and communication engineering, which is part of the present comprehensive study. Hence, this article's work focuses more on airplane vehicles (aeronautical) and their travelling directories. On the other hand, with in-flight technologies and advancement that involves spacecraft operating in outer space, the broader term of aerospace engineering has mostly replaced it in common usage. The field of aerospace engineering, especially astronautics, is often conversationally referred to as "rocket science." Figure 1 shows the process and focus of the present study related to Islamization and aerospace engineering. Also, how the present work focused and proposed to investigate the relation between Islamization and engineering (aerospace) studies.

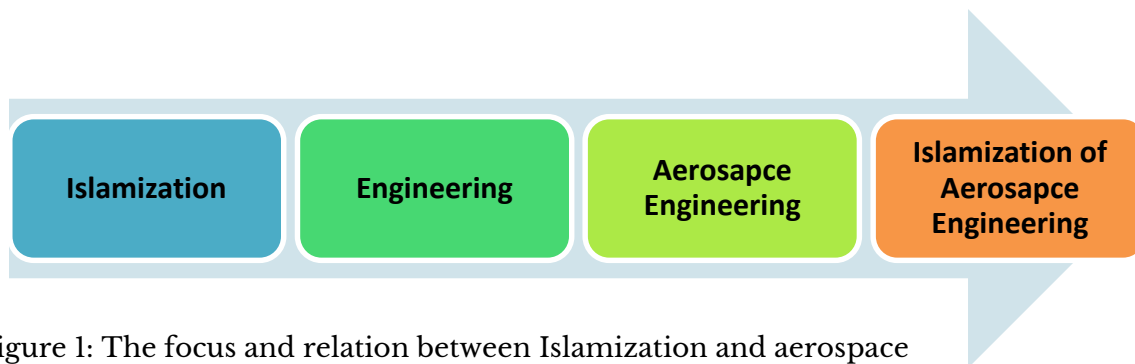


Figure 1: The focus and relation between Islamization and aerospace engineering

1. **Fundamentals on Islamization of Knowledge (IOK):** The Islamization of Knowledge (IOK) is sole and essential. In the literature review, many are represented differently, and it is vital in life and other parts of the world. Islamization is to understand the reality of the things which relate the humanity and its activities. The holy Quran discussed all the

things that come under the sciences and technology, history, economics, etc. The knowledge which never ends in life is that Islamization is the most crucial part of the information if we understand Islamization means we know reality and humanity. It teaches how to leave a life authentically and how to survive in life. The knowledge to define many other activities such as technology includes mechanical, electrical, civil, electronics, computer science, aerospace, biomedical, instrumentation, etc., and science including medicine, pharmacy, homoeopathy, Ayurveda, etc. this is the knowledge related to Islamization. Many Muslim scholars represented the IOK in different views and defined it which is another way they also analyzed the further procedure. Still, in all the conditions and from the other scholar, the solution is the only one said in the Holy Quran's importance of Islamization.

By the IOK, it should first be clear that the root of truth should be Islamic, i.e., revelation described by the Quran and the Sunnah, and existence as embodied in the natural universe. Second, the means of acquiring knowledge must be Islamic in such a manner that the God-given faculties of reason and the rest are used alongside the Fitnah forces of discretion. Finally, the effects of this calculation must be consistent with the following requirements:

- Human nature
- The natural laws of the universe
- Islamic teachings: principles and injunctions
- Islamic values: both moral and aesthetic

Indeed, IOK is something that we believe is the responsibility of everyone capable of contributing to it. Revitalizing the Ummah, its educational systems need to be remodelled to reflect its own identity rather than the Pythagorean worldview of the Western models available. The following recommendations can prove beneficial [1]:

- Any intelligence that can be proved to be empirical can legally be recognized as Islamic
- Awareness must be developed within the general context of the Islamic scheme of things related to life in the world. In other words, Muslims can never lose their perspective. Indeed, the Quran is severe in condemning the unbelievers for their failure to comprehend natural events within the broader sense of Allah's world order.
- Any action either by the individual or by the society contradicted by the fundamental value of Islam must be rejected. This is where Muslim social scientists' and technologists' contributions can lead to the creation of an integral Islamic society in which man will accomplish his mission on Earth.
- In the sense of the broadest view, stakeholders should conclude that the past of the IOK has begun.

2. **Survey on Islamization of Knowledge (IOK):** The thoughts, research, philosophies, and opinions cannot come after the ultimate offer of relief to the man. Paper-based on IOK comprehensive phenomenon that re-establishes the knowledge on its original basis per the light of revealed knowledge. Muslim thoughts, attitudes, and behaviour and characterized by a commitment to reviving Islamic civilization. It argues that IOK is the continuous process of “moving towards moving targets,” which means if we learn more about IOK, we move to our target. Need serious evaluation before admitting, denying, integrating, or combining can be accomplished in emerging Islamic knowledge [2]. Man, and education-this evidence, all might Allah is the source of wisdom for all Muslims, and two kinds of experience have been given to man that is revealed and gained. To discuss and try and shed some light on the IOK, humanity, and education topic has been shown by Migdadi [3]. A range of essential guidelines for Muslim scholars, education decision-makers, stakeholders, and practitioners to address Islamization holistically and effectively has been proposed. Many of the items specified are helpful, such as the IOK discussion, the need for IOK, secularization, and dualism are discussed. Fundamentally these ideas reveal that man and education in IOK [3].

According to Al-Attas and Al-Fauzi, the two Muslim thinkers were foremost in conceptualizing the problem of Muslim Ummah and the issue of IOK as an epistemological and socio-political solution. They examine, compare, and analyze the concerns in various interpretations of the concept of IOK. To recognize the similarities and differences and the strength and weaknesses of their conceptions, philosophical framework, and methodology has widely introduced by Al-Attas and Al-Fauzi. It explores the possibility of reconciliation between their ideas in the hope of further advancing the cause of IOK. The idea of the IOK organization has awakened the Muslim Ummah from their comfortable slumber. Two Muslim thinkers, synthetic ideas in the hope of further advancing the cause of IOK have been shown. Methodology empirical and rational the deductive and inductive review, analysis based on assumptions about IOK has been revealed by Rossidy and Imron [4]. Aris [5] said that trying to translate the concept of IOK was influential in the art's current state. Examining, comparing, and analyzing their ideas of IOK to look for some similarities and differences between them was important. He also defined; that IOK is to redefine; the reorder relates to it. Analysis of the knowledge is not value-free, and it is value loaded and attainable—the concept of methodology, ontological, epistemological, and axiological principles.

Spread to the light of Islamic knowledge, values in the student's character and achieve the learning in the respective fields through the medium of modern education. The higher area of understanding of alienated from the interpretation and the intellectual work done by the Holy Quran. The gap is due to the lack of intellectual vision of Islam in the disciplines taught at a higher level. We aim to explore the Quran's factual knowledge to demolish the difference in Muslims' attitudes and the demands of the holy book. The misuse of Islam can be stopped by introducing the modern intellectual and spiritual wisdom of the Quran in Education. The understanding of Islam lies in the deep work in the insight of the historical background, which formulates Islam [6]. The author also has stipulated the basic concept of Islam and its philosophy with the Quran and Sunnah's

values. They also solved the fundamental questions such as the meaning of Islamized knowledge, its knowledge possible, is all knowledge acquired, the source of our knowledge, and the scientific method. He specified the answers with Islamic revealed and the Quran and Sunnah's value and its knowledge related to the sciences and humanities. The work plan, both Islamic and Western, can be defined as a dual-phase of incorporation since modern and traditional Islamic knowledge is renovated [7].

The IOK method is one of the most critical and philosophical movements of the 20th century. It is also one of today's most reliable and long-standing intelligent Muslim responses to modernism. The undefined form and framework of the mechanism of Islamization made it a daunting challenge and recognized it more as a theoretical than an actual methodological strategy. In general, it includes its history, its meaning, and its pioneers. Moreover, the Islamization of science topics is specific to creating a structure for this phenomenon, based on Al-Farouqi's 12-step work-plan and Berghout 's framework using a descriptive, theoretical theory [8]. Muslim scientists' attitudes and expertise will play a key role in the efforts of knowledge in Islamization. Regrettably, all sciences, including today's engineering and technology methods, which flourished in the hands of Muslim scholars in the middle ages, are entirely void of Islamic attitude and spirit. Today's Muslim scientists are obliged by the Muslim Ummah to bring the spirit of science back to the spirit of Islam. A realistic proposal with clear plans should be followed, both academically and theoretically, in the process of Islamizing science and technology [1].

The surge in the influx of Islamic awareness and ideals into engineering education has arisen, having recognized the gross inadequacy of Western / Secular Engineering Education, which is directed only at individuals' external growth. The goal of incorporating Islamic ideals is to establish a healthy student identity, pleasing God and fellow human beings who foster and inspire Ma'ruf (right) and fight against Munkar (evil). To analyze the current engineering education system in kulliyah of engineering, international Islamic university Malaysia involves two areas which are relevant to the entire debate on the subject. The two principles are current engineering education and Islamic understanding, incorporated into the engineering curriculum. The writers also suggested a framework for Islamization of the engineering program, identify some of the proposed frameworks' challenges, and are likely to attempt to find alternatives to their success [9].

3. **Role of Islamic Studies in Engineering:** As we discussed in the previous chapter, Islamic study plays a significant role in technology. We state that *"Technologies come from Islamization"*. One of that aerospace engineering is the knowledge of birds which are executed in the object. Now the technologies developed the airplane with many facilities, and they are carrying tons of load into the air. From an Islamic perspective, aerospace engineering is discussed in the Holy Quran, the role, definition, analysis, and importance are discussed with the example of flying birds in the air. Islamic studies are the fundamental things, which are useful for delivering technology.

Insufficiencies in the engineering curriculum have been thoroughly revised in recent years. The various committees advised the heads and professors as part of the

Engineering Accreditation Councils (EACs) that the curriculum would improve their coverage of the basics. More on real-world engineering architecture and processes, including quality control, have been advised. They need to discuss more materials in boundary infrastructure and have more and better training in oral and written communication and coordination skills. Provide instruction in analytical and innovative thought skills and problem-solving approaches. They can relate technology to society and minimize the number of hours in the engineering curriculum. Students and average students will not be burdened and will finish the course within four years of engineering studies.

Previously, Muslim scholars have effectively led the world with their expertise and scientific advances that resulted from in-depth research, translation, and the foundation of the early Greek philosopher's writings. Later in the fifteenth century, Muslim society experienced a decrease in the desire to pursue knowledge. Western societies grew by developing their academic base from the Muslim institutions Niyazov and Memon [10] Islamic education has recently reached a crossroads. In contrast, Islamic academics need to make a critical decision to engage in partnership with contemporary modern or western awareness.

Islamic institutions need a clear and full partnership in the future to guide Islamic nations to triumph and reconcile themselves with the traditions of the new millennium since it is not possible to rely on the past. Due to Muslim societies' conditions, it is a great time to encourage contact with western awareness rather than embrace a denial mindset. A collective approach to Islamic practice will have a competitive benefit for Islamic and non-Islamic schools, colleges, and universities of thought.

Over the last decade, with recent technological developments and breakthroughs, Muslim and non-Muslim researchers have recognized that contemporary scientific understanding is unique to Western culture in terms of principles and definitions. An essential fact of practice has informed the concepts and ideas of IOK by Muslim scholars. The first international conference on Islamic education was held in 1997 in Makkah, Saudi Arabia. The Platform claimed and integrated information from an Islamic point of view. Muslim academics have made a great deal of effort and proposed diverse approaches to the collaboration of Islamic principles and ethics in various fields of western thought. Since then, various innovations have been introduced along with the growth of the discipline in philosophy and practice. The idea of Islamizing western sciences has been a focal point of concern for many Muslim scholars and intellectuals. It is considered to be one of the most critical academic movements of the 20th and 21st centuries and one of the most authoritative and long-standing intellectual responses of contemporary Muslims to modernity.

The idea of Islamization of science is about thirty years old. Various experiments, debates, books, papers, and seminars have been commonly proposed to clarify conceptually and realistically during this time. However, despite the excitement, the work remained constrained by the number of proposals suggested by various people, organizations, or schools of thought. Besides, no progress has been made because of a

unified consensus on the actual definition of Islamization and a lack of competent comprehension of the framework, as each Muslim scholar claims a different viewpoint. Regrettably, the low economic and political status of Muslim culture across the globe has brought more pressure to bear on western understanding and modernity in all respects (political, economic, social, and educational) that have contributed to the infiltration of western cultural and philosophical ideas and values. The connection between science and the Islamic worldview of education has long been confused. This feature posed two critical concerns. Second, because of the misapprehension of main words and their substance, which is known to be science? Second, which one is Islam? The critical lesson learned from the IOK project is that Muslims have not sufficiently addressed and accepted the philosophical and methodological problems of western sciences, which they have tried to debate and attempt to Islamize.

It proposes that approach through research as theoretical assemblies composed of four components: the body of knowledge, the leading theory, the methods of analysis, and, ultimately, the aims. The four sections should then be analyzed and interpreted in the domain of Islam. In general, to understand the Islamic criticism of modern science and consider its connection with Islam, it is essential to realize that the Holy Quran has a significant impact on the Muslim mind and its global culture in a similar way. There are numerous commitments made by researchers in the IOK project. The best outcome of the relationship between modern science and Islam is in terms of the Islamic viewpoint. They discussed previous attempts already made by chosen and groundbreaking Islamic scholars, based on its start-up and improvement. This involves topics such as the IOK, significance, usefulness of the IOK protocol, and the role of IOK in the current grant and writing process.

Faruqi was the first scholar to detail the Islamization project when he defined the five concepts of Islam that must be incorporated into western understanding (the unification of God, the whole of creation, truthfulness and experience, life, and humanity). Based on these concepts, al-Faruki developed a five-step outline for Islamization:

- To be a contemporary science and technology specialist.
- To be a specialist in those areas of Islamic knowledge.
- To show Islam's importance to contemporary sciences and technology.
- Comparing and linking Islamic principles and ethics with western social science.
- Introduction of an Islamic theory that aligns with the ideals of Muslims and about ethics.

4. **History of Aerospace/Aeronautical Engineering:** Aerospace Engineering is the branch of science that deals with the study of airplane design and structure, space shuttle, rocket, launch vehicles, satellites, and missiles. The vehicles which are flying in the air and space are a part of aerospace engineering. Many scientists and scholars from the 19th century are discovered flying an object in the air, but our question is where this idea comes from? Only, it comes from the knowledge of the Holy Quran and the best example from Allah's making "flying bird". Hence, the vehicle can fly in the air has been discovered from the fundamentals of the bird. Analysis of the bird's flight simulates the same observation. An

object like an airplane is found to fly in the air. Unfortunately, many scientists are failed due to a lack of knowledge in the beginning as the days go on. They understand the concept after hundreds of years from the wright Brother; they launched the successful airplane on December 17, 1903 [11].

A brief historical sketch of some of the heritage behind contemporary aerospace engineering has been given. The key steps of regulated, manned, heavier-than-air, propelled flight are outlined as follows [12]:

1. The ornithopter was conceived by Leonardo da Vinci and leaves over 500 sketches of his design, drawn between 1486 and 1490. This approach to manned flight, though, continues to be inadequate over the intervening decades.
2. On November 21, 1783, the Montgolfier hot-air balloon floated over Paris. A human being is raised and carried through the air for a prolonged period for the first time in history.
3. The year 1799 is a red-letter date for the advancement of aeronautics. In England that year, Sir George Cayley depicted his design of a fuselage, a fixed-wing, and horizontal and vertical tails on a silver disc. He is the first person to suggest independent lift and propulsion generation processes. He is the ancestor of the new airplane design.
4. The Frenchman Felix Du Temple in 1874 and the Russian Alexander F. Mozhaiki in 1884 achieved the first two power hops in history. They may not, however, truly reflect managed, continuous flight.
5. The first truly successful gliders in history were designed by Otto Lilienthal. He made over 2500 successful glider flights during the 1891-1896 period. Lilienthal may have mastered powered flight before the Wright brothers if he had not been killed in a glider accident in 1896.
6. With his small-scale Aerodrome in 1896, Samuel Pierpont Langley, secretary of the Smithsonian Institution, completed the first continuous heavier-than-air, unmanned, powered flight in history. His attempts at manned flight, though ineffective, the last one falling on December 8, 1903-just nine days before the spectacular success of the Wright brothers.
7. In the history of aeronautics, also in the history of civilization, another red-letter date is December 17, 1903. On that day the first operated, sustained, powered, heavier-than-air, manned flight in history was accomplished by Orville and Wilbur Wright at Kill Devil Hills in North Carolina. This flight is aimed at revolutionizing life in the 20th century.
8. After the public exhibitions of the Wright brothers in Europe and the United States in 1908, the progress of aeronautics took off exponentially. A significant "aeronautical triangle" in the history of aeronautics before World War I is the continuing work of Glenn Curtiss and the Wrights and the continued influence of Langley's early work.

Related historical notes will appear in the rest of the work [12], to help to explain the legacy of aerospace engineering as the technology progresses throughout the twentieth century. These historical notes are supposed to bring a new layer to the emerging knowledge of this technology.

5. **Aircraft Journey:** As we all know the present economic condition, people want to save/consume their time for more output/production. One of the biggest efforts on saving time is the travelling in which people only want to wait to reach their destiny. There is a number of transportation types such as buses, trains, different vehicles, aircraft, space shuttle, etc. Which aircraft is only the transport type where it travels different time zone except the Russian train (Trans–Siberian Railway) [13]. Aircraft flying in different time zone and directions therefore some of the common issues faced by the Muslim followers. Hence, this paper has considered such an example to explore it and discussed some of the factors and suggested an approximate solution. Generally, A considerable amount of public transport is exported to all countries. An airplane is used as a significant transport facility from one country to country. For international journey transportation, the flight is a significant role that people are using these days. Technology is developed, and airplanes are designed as better facilities.
6. **Praying concerns during long travel based on Islamic Perceptions:** From a science and technology perspective, airplanes are the most critical transport vehicles employed for long distances and countries' travel. Some flights in current economies can travel the longest distance from north to south or east to west. Generally, it covered a long distance from one place to another place. The world/earth is flattened at the poles and bulged at the centre. Geodesy represents the shape of the earth with an oblate spheroid, and the flight passes around orbit with gravitational force. In these cases, for Muslim followers the biggest question of praying salat with time following?

Based on Ref. [14] the first one is very popular with the Muslim community and states that Neil Armstrong heard the Muslim call to prayer on the moon. Being Muslim followers all we know very well is five times of prayers should we perform without missing Jamaat. In this work, the major consideration is based on the long travel from aircraft is defined in which Prayers should perform while flying on the airplane. Generally, the Adhan is performed in different time zone therefore some prayers merge, and it is needed to know which prayers travellers can perform based on the time and current location. For example, the flight is flying from Qatar to New Zealand. Qatar Airways will use the Boeing 777 aircraft for this route. Travel math puts the flight time between Doha and Auckland at around 18 hours and 34 minutes. In this situation, the person wants to pray a salat at the same time while he is in flight, so the question is, which Prayer? Because the time is fluctuating. The time zone of Qatar is different from New Zealand. The person who performs a prayer he/she follows the departure time, but at the same time, the time will be changing, and it should be different. It is challenging to say which prayer Muslim Ummah should perform. The Holy Quran has been guided by Muslim performers on the timing of Prayer according to the sun variation and environmental effect. As per our studies, the Muslims can follow the two ideas to save the Prayer during the flight journey. First, they should follow the sun variation for performing salat, and the other one is they should follow the departure timing additionally if the journey during nighttime, then no concerns. For example, if a person can pray on board, then he should do so. If the Prayer falls due while he is on the plane can be joined with another prayer, later on, e.g., Zuhr, which he can delay and join with 'Asr, or Maghrib, ' he can delay and join with 'Isha', possible to do that.

Another most important is to follow Qiblah during the flight journey. How could we decide the Qibla (direction)? Praise be to Allah. If a traveller is on board and wants to pray a naafil prayer, he can pray in any direction (Qibla) no matter what direction he is facing. He does not have to face the Qiblah because it was narrated that the Prophet (peace and blessings of Allah be upon him) used to pray while riding his camel, no matter which direction it was facing during travel. But in the case of the obligatory prayers, it is essential to meet the Qibla and to do rukoo' and sujood if possible. He/She can ask the stewards about the direction of the Qibla if he is on board an airplane that does not have a sign to show the Qibla's direction or Muslim travellers can use the electronic device to see the Qibla. If he does not do that, then his Prayer is not valid based on our investigation from Ulama and Iman's questioning. In addition, some other issues are also possible during long-distance travellings such as clean maintenance of the seats, ablution (wazoo) facility or any other based on Islamic perspectives.

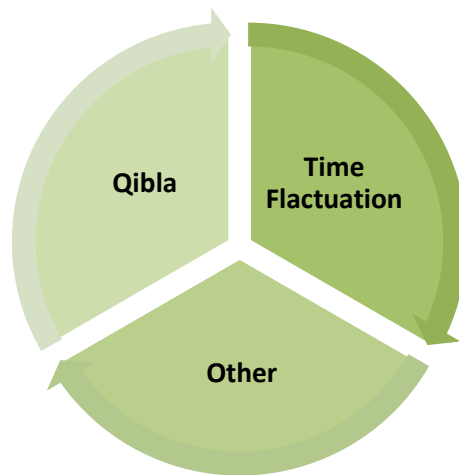


Figure 2: Some issues during long-distance airplane travelling

7. **Conclusion:** This paper aims to describe the central concept of aerospace engineering and its connection with Islamization. Also, history and background of aerospace engineering and fundamentals of Islamization in engineering aspects. Some of the other conclusion has been stated below:
1. The fact of the flight journey for Muslim Ummah to perform the Prayer into the flight has been discussed. It is identified that travellers can follow sun variation or departure timing.
 2. To find out the Qiblah to perform salat, Muslim travellers must ask the stewards about the direction of the Qiblah if he is on board an airplane that does not have a sign to show the Qiblah direction can use the electronic device to see the Qibla.
 3. If a traveller onboard the plane wants to pray a naafil prayer, he can pray no matter what direction he is facing. He does not have to face the Qiblah because the Prophet's companion narrated that the Prophet (peace and blessings of Allah be upon him) used to pray whilst riding his camel no matter which direction it was facing if he was travelling.

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