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Muslims in Space: Observing Religious Rites in a New Environment

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The first men to fly into space precipitated comments about religion and God, but for most of the history of human spaceflight these comments related to Christianity. As International Space Station partners recruit spacefarers from Islamic countries, they face new religious challenges. Islam is distinct from other large monotheistic religions by virtue of the fact that Muslim worship practices require routine attention to Earth geography and astronomy. It is a vantage point that changes in low Earth orbit. Recent Muslim astronauts and cosmonauts have led the way in adapting religious practices to their position above the Earth.

In this post–Cold War spaceflight era, the United States, Russia, and the other International Space Station (ISS) partners are cultivating numerous nations for collaborative programs. As they move beyond the Western allies, however, Islamic countries from Africa, the Middle East, and Asia present a specific new challenge for partnership. Islam is distinct from other large monotheistic religions by virtue of the fact that Muslim worship practices require routine attention to Earth geography and astronomy. Devout Muslims pray facing toward Mecca five times a day. The Islamic lunar calendar is timed to the visibility of the Moon. Sightings of the new Moon in the ninth month determine the beginning and conclusion of the month of dawn-to-dusk fasting during Ramadan. Muslims who travel must refer to their domestic religious leaders for guidance on how to comply.

As such, human spaceflight offers challenges to Islamic worship. There are no obscuring clouds that hinder viewing the Moon. Low-Earth orbiting spacecraft circling the Earth at orbital speeds makes the task of orienting oneself towards Mecca almost impossible. Of the very small number of Muslims

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who have spent time orbiting the Earth in the last three decades, only half have taken on the challenge of modifying their practices to fit spaceflight. Those few have made inroads towards defining ways in which their rituals of faith can adapt to and enhance their spaceflight experience.

RELIGIOUS RITES

When the Games of the XXX Olympiad in London began in the summer of 2012, the international press expressed concern over the fact that this time the Games coincided with the ninth month of the Islamic calendar, Ramadan. Under the strictest interpretation of Islamic law, Ramadan calls for observant Muslims to fast and abstain from drinking water between sunrise and sunset. The fast is broken only after one month, when the crescent new Moon is spotted and the end of Ramadan is celebrated with *Eid al-Fitr*. In 2012, almost one-third of the Olympic athletes in London (3,000 out of over 10,000 athletes) were Muslim.¹ Although there was no comprehensive survey to determine how strictly any of the athletes observed their religious laws, one can only assume that there were many who faced the conflict between following their traditional observances and performing at their best in athletic competition.

There was a range of responses available to these athletes. Some Muslims interpreted the Koran's writings about the duty to fast during Ramadan as being flexible during travel or that later charitable work can substitute for observance of the fast under special circumstances. Others, facing the lack of a central theocratic authority in Islam, turned to Islamic scholars in their respective countries for guidance on fast breaking or requested a *fatwa*, a religious edict, to allow them to forego or postpone the Ramadan fast. Interest in the effect of fasting during Ramadan was not limited to Muslims and journalists. A group of physiologists even went so far as to investigate the consequences of fasting on athletic performance, concluding that there was no great effect.²

Participating in the Olympics during Ramadan is not the only case in which fasting might have a negative impact on high physical performance. The case of the nine self-identified Muslims who have travelled into space in the last 50 years has been quite different. In space, fasting from sunrise to sunset is not a problem. However, orbiting in low-Earth orbit (LEO) poses unique challenges for Islamic rites regarding geography as the sun rises and sets at least 16 times a day and every 90 minutes. This relatively small subgroup of all space travelers has demonstrated that there are variations on practices among Muslims while travelling in space. Unlike the interest in Muslim athletes at the Olympics, increasing attention paid to the practice of Islamic faith while in orbit is a result of the significance of world attention to Islamic countries, not an increasing number of Muslims in space.

By the summer of 2012, just fewer than two percent of all of those who have flown in space have been Muslim. There have been nine Muslims out of

the 528 people who have met the Fédération Aéronautique Internationale's (FAI) criteria that defines spaceflight as any flight over 100 kilometers (km) in altitude. This proportion contrasts sharply with the near one-third of Olympic athletes in London. This discrepancy is easily attributable to the fact that the United States and the Soviet Union have dominated human spaceflight activities for the last half century. Much like the first 40 years of human spaceflight, the Muslims who travelled into space are divided among those who travelled in Russian spacecraft and those who travelled on board the American Space Shuttle. While the United States initially only recruited white Christian males for the astronaut program, Russia considered mainly ethnic Russians, Slavs, and well-Russified minorities to become cosmonauts. And not surprisingly, Soviet-born pilots dominated the list of Islamic space travelers.

MUSLIMS IN SPACE

The first Muslim to fly in space was Sultan bin Salman bin Abdul-Aziz Al Saud, a Saudi Prince and Air Force pilot. Sultan Bin Salman earned his Bachelor's and Master's degrees in the United States. Although there was no mention of issues of adhering to Islamic law during his flight on board the Space Shuttle mission STS-51-G *Discovery* in 1985, one might reasonably assume that Colonel bin Salman had resolved these issues with Saudi religious leaders at a prior time during his much-travelled career. The only issue that seemed to fascinate the Western press was concern over how the prince could find enough time and the proper position to pray five times a day in the direction of Mecca when a day passed every 90 minutes. The Saudi pilot made his personal accommodations to his religion. Sultan bin Salman did carry a small Koran into space; inside was the prince's Saudi pilot's license and a prayer dictated by his mother asking Allah to take care of travelers. Also, Sultan bin Salman did not brush the issue of Ramadan out of sight. One of his prescribed experiments was photographing the Moon during his stay in orbit:

In another first, Prince Sultan sighted—and photographed—the new Moon from above the Earth rather than on it; this is important in Muslim life because the sighting of the new Moon at the end of the Muslim month of Ramadan signals the end of the Ramadan dawn-to-dusk fast and the start of the joyous Id al-Fitr holiday.³

It could be that his efforts to sight the new Moon were deemed sufficient compensation for not fasting while preparing for flight and orbiting the Earth.

After Prince Sultan bin Salman, the next two Muslims who flew in space were from largely secular non-Soviet states and flew on board Soviet spacecraft. Each traveled during the height of activities for the Soviet *Interkosmos*

program, which, among other activities, launched cosmonauts from allied countries to orbiting space stations. Muhammed Faris, an Air Force pilot from Aleppo, Syria, flew to the space station Mir in 1987 when Soviet-Syrian relations were close. Afghan cosmonaut Abdul Ahad Mohmand was nominated to the Soviet program and flew to Mir in 1988, while Soviet troops were concluding their decade-long occupation of Afghanistan and fighting largely Islamist resistance fighters. Mohmand was a Soviet-trained Afghan Air Force pilot with a combat record that was shrouded in secrecy. Mohmand's flight occurred after Russia began to withdraw its troops from Afghanistan. His flight sought to demonstrate continued good will and support between Moscow and Kabul. Mohmand appealed to his countrymen to "stop the war and direct your forces toward building a durable national peace."⁴ This was part of the Soviet-backed Kabul government and President Najibullah's strategy that included a proposed cease fire during the mission.⁵ The Afghan cosmonaut launched on Soyuz TM-6 along with the current long-duration space record holder Valeri Polyakov. During his mission, Mohmand took photographs of remote areas of Afghanistan in areas where guerrilla action was still taking place. Consequently, he fled to Germany when Soviet troops left the country and has been a German citizen since 2003.

Among the nine Muslims who have flown in space, four were initially Soviet citizens; all were born in predominantly culturally Islamic republics of the former Soviet Union. Islam was the second largest religious affiliation in the territory of the former Soviet Union after Orthodox Christianity. The first Soviet Muslim cosmonaut was Musa Khiramanovich Manarov, who was born in the capital of the Azerbaijan Republic. Manarov was a Soviet Air Force pilot with a degree in engineering when he was selected for the cosmonaut corps in 1978. Manarov's first flight occurred after Mohammed Faris's *Interkosmos* flight, but before Mohmand's flight. With two flights to the Soviet space station Mir in 1987 and 1990, Manarov spent over 574 days in space, including a mission of over 365 days from the end of 1987 to 1988. It is certain that he was in orbit during Ramadan in 1988, but he has never discussed special accommodations or activities for his faith during that time.

Kazakh Air Force parachutist Toktar Ongarbayuly Aubakirov was born in the Soviet Republic, but was a citizen of independent Kazakhstan when he began training to become a cosmonaut. His only mission into space was a seven-day excursion in October 1991 that did not coincide with Ramadan that year. Aubakirov's countryman Talgat Amangeldyuly Musabayev trained and studied throughout the European regions of the former Soviet Union before his recruitment into the cosmonaut corps after the dissolution of the Soviet Union. During his career as a cosmonaut, he made two long-duration trips in 1994 and 1998, and one short-duration mission in 2001, to Mir. Musabayev's missions did not coincide with the Muslim month of fasting.

Kirghiz-born and ethnic Uzbek pilot Salizhan Shakirovich Sharipov is the only one of the four that has flown in space on both an American space

shuttle and a Russian Soyuz. Selected for the cosmonaut corps just prior to the collapse of the Soviet Union, Shapiro's first mission in space was on-board Space Shuttle Endeavour STS-89, the eighth docking mission between the Space Shuttle and the Russian Mir in January 1998. Shapiro's next mission was for just over six months as part of Expedition 10 to the ISS in 2004–2005. His first mission occurred just after the celebration of the breaking of the fast, *Eid al-Fitr*, after the 1997 Ramadan; his second launch, this time from the Baikonur Cosmodrome in Kazakhstan, took place on the morning before the 2004 Ramadan. Interestingly, in his NASA pre-flight interview, the interviewer explicitly asked the cosmonaut about Ramadan celebrations and observances, albeit without explicitly naming the “upcoming holidays” during his flight. Shapiro's response to the question was suitably secular:

A holiday is important: it is an opportunity to forget about work, to relax. Especially for us, a holiday means that we can be with our families, see their faces, talk to our kids. And for cosmonauts who are in space, this is something that we are looking for, always. The holidays that you are talking about will probably be interesting as well, because we will be communicating with our families and we will be also working on what we have to do.⁶

Either through ignorance of the Islamic calendar or disinterest, Russian-language pre-flight interviews with Shapiro made no mention of Ramadan or allusions to the holidays. Given that Islam was the second largest religion in Russia just after Russian Orthodoxy, it is doubtful that the omission was a direct attack on Shapiro's religious practices. It was more likely that the Russian interviewers were following the Soviet tradition of ignoring direct mention of non-Russian-Orthodox religious observances.

It is not surprising that Soviet-raised Muslim cosmonauts did not have great concerns over flying in space during Ramadan. Each one had grown up in a nation that had an official policy of atheism in place during their youths. Even Russian Orthodox believers grew up in a climate in which religious discretion was the best practice for those who sought to advance their professional careers. For Russian Orthodox Christians, attending church and wearing an Orthodox cross were not immediately disqualifying acts, but neither were they publicized. Throughout Russia, religious leaders followed the practice of subordinating their own interpretations of scripture to the requirements of the state. At the time of the Soviet Union, the country was officially atheist and culturally secular and the existing Islamic scholars would have likely subordinated their interpretations of the Koran to the interests of accomplishing the cosmonauts' space mission.

This more secular orientation also held true for the sole female follower of Islam who has flown into space: Iranian-born American Anousheh Ansari.

During her eight-day, self-financed “tourist” spaceflight to the ISS, Ansari conducted European Space Agency–sponsored experiments. The only quasi-religious issue that touched her mission was her announced intention to wear a patch of a politically neutral version of the Iranian flag that would avoid affiliating her with the 1979 Islamic Revolution in Iran. Her decision and the controversy were far more political than religious and said much more about Iran’s foreign relations with the rest of the world than Ansari’s religious sentiments. Questions about the role of religion and her mission were abstract. In an interview for an American popular magazine for North American Muslim women, the author summed up Ansari’s sentiments thus:

She sees no tension between faith and science. “I think they are very complementary. When I look at the universe, I see a delicate balance and it helps to strengthen my spirituality.” A student of astronomy, Anousheh points out that “nothing you learn today is certain. As our knowledge grows, we might learn what we thought was true, is not true.” If Ansari made any religious accommodations to her flight, she kept them to herself and even the Iranian press chose to celebrate her accomplishments as a scientist and explorer and avoid the question of her religious or political fidelity.⁷

From the Iranian perspective, Ansari’s mission probably did more to generate Ramadan humor in Iran than political or religious discomfort. One newspaper reported popular jokes surrounding her flight. One joke claimed that clerics were refusing to look for the Moon during her flight to identify the first day of Ramadan for fear that they would see a woman without a veil. Another claimed that Ramadan would last for two months instead of one as they had seen two moons at the beginning of the month, playing on the use of the Persian word moon as a reference to a young girl.⁸

OBSERVING RELIGIOUS RITES IN SPACE

The most recent and most profound instance of a Muslim flying in space during Ramadan grew out of Russia’s foreign relations in the post–Cold War world. During the late twentieth and early twenty-first centuries, Russia conducted a courtship of the Association of Southeast Asian Nations (ASEAN), offering itself as an alternative to American unilateral dominance in Asia.⁹ Malaysian prime minister Mahathir Mohamad had expressed vocal concerns over ostensible U.S. efforts to dominate Asia.¹⁰ Russia also placed much importance on relations with Malaysia.¹¹ As a consequence of these shared interests, Moscow agreed to train and send a Malaysian cosmonaut into space as part of a larger deal that included Malaysia’s \$900 million purchase of 18 Russian-made Sukhoi-30 MKM fighter jets in 2003.¹²

The Malaysian cosmonaut was the first person to openly confront the merging of Islamic practices with human spaceflight. A Malaysian orthopedic surgeon, Sheikh Muszaphar Shukor, was one of two candidates for the country's first human spaceflight. Shukor was not the first person to fly in space whose religious practices drew the attention of the press, though he was certainly the first Muslim.¹³ Shukor's flight as part of the Expedition 16 crew to the ISS in October 2007 coincided with the last part of Ramadan. In advance of his flight, he requested guidance on how to comply with religious practices from the Islamic National Fatwa Council. The Malaysian council drew up the first comprehensive guidebook for Muslims in space in response. The 18-page guidebook is titled "Guidelines for Performing Islamic Rites (*Ibadah*) at the International Space Station," and instructed Muslims on practices and rites, such as how to pray in a low-gravity environment, how to locate Mecca from the space station, how to determine prayer times, and issues surrounding fasting during Ramadan on a 90-minute day-night cycle.¹⁴

Although it was locally generated, the advice was clearly thought to apply to all Muslims and has been translated into Russian, Arabic, and English. The council justified the wide distribution of the guidelines in the introduction, "The reason we formulated guidelines for Muslims in space is because we wanted to ensure our astronaut could fully concentrate on his mission, without having to worry about how he should perform his religious obligations in space," said Abdullah Md Zin, a minister for religious affairs in Malaysia. Malaysia's Department of Islamic Development declared that fasting while traveling is optional, so Shukor could choose what he would like to do, but if he did decide to fast in space, the times would be centered around local time in Baikonur, where the launch takes place. Sheikh Muszaphar celebrated *Eid al-Fitr* aboard the space station, and packed some traditional Malaysian satay and cookies to hand out to the rest of the crew on 13 October 2007 to mark the end of Ramadan.

As discussed herein, Islam is unique as a major religion in that it demands regular attention to the sky and geography to satisfy worship requirements. Orbiting in space calls for special adjustments to those practices, especially for geographic orientation for prayer and the observation of fasting schedules. To these ends and for the immediate future, Muslims who visit the ISS will have the Malaysian guide that will allow them to complete their mission and practice their faith without conflict.

CONCLUSION

Since Ramadan is the ninth month in the Islamic lunar calendar, it occurs at different times in the solar year. It might be that Ramadan will coincide with the 2014 Winter Olympics in Sochi. If that happens, Islamic participants will, once again, confer with their respective national religious councils to

determine the rules on fasting and prayer while competing. It is also likely that the Russian government would install prayer rooms at locations throughout the Olympic venue, even considering that there would be far fewer winter Islamic Olympic athletes than there had been in London in the summer of 2012.

In contrast, the ISS is likely to host more practicing Muslims in the future. The United States, Russia, and ISS partners will likely reach out to include predominantly Islamic countries on missions in space as incentives for political and military alliances, and to encourage scientific and economic development in those countries. In 2010, NASA Administrator Charles Bolden was criticized for citing outreach to Muslim countries as one of his priorities.¹⁵ The Obama Administration deferred to the criticism, but did not slow its outreach to the Asian Pacific rim countries. The Russian Federation has sought to maintain its ties to its former Soviet Central Asian republics and China through the Shanghai Cooperative Organization.¹⁶ Both the United States and Russia have chosen to address interests of predominantly Islamic nations through space cooperation.

NOTES

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10. *Ibid.*, 800.

11. *Ibid.*, 803.

12. *Ibid.*, 795.

13. Religious observances in space include those practiced by American astronauts, including reading from the Old Testament book of Genesis from the Apollo 8 spacecraft and Buzz Aldrin's decision to take communion while on the surface of the Moon. These observances are discussed in other articles in this special issue of *Astropolitics*.

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