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TIME FLIES: A GUIDE TO TIME-RELATED *HALACHOS* WHEN FLYING

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The STAR-K office and its Institute of *Halacha* receive hundreds of inquiries from STAR-K *mashgichim*, businessmen and tourists traveling to all corners of the globe. The most common questions relate to *kashrus* information. However, more common than ever are *shaalos* related to *davening* and other *halachic* issues impacted by changing time zones while in transit. There are excellent websites[1] that project the times for sunrise, sunset, and other *halachic zmanim* for aircraft passengers. A basic understanding of the *halachos* that relate to these times and the *metzios*[2] enhances the use of these powerful tools, which is analogous to how we can increase the usefulness of a GPS by possessing a basic knowledge of the route one must drive.

I. What Happens In-Flight?

As is well known, the sun rises in the east and sets in the west. In the summer, the days are longer (earlier

sunrise, later sunset), and in the winter the days are shorter (later sunrise, earlier sunset). In the Southern Hemisphere, the day lengths are the opposite – summer begins in December and winter in June.

When one flies west, one is flying "in the same direction" as the sun. Therefore, one encounters *zmanim* slower than usual. For example, if it is 1:00 a.m. in early March in Tel Aviv where Reuven lives, he can say, "The sun will rise in 5 hours (i.e., at 6:00 a.m.) and I will *daven Shacharis*." However, if Shimon departs at 1:00 a.m. from Tel Aviv on a flight to New York, after 5 hours he will be west of England where the local time is 4:00 a.m (the middle of the night and, therefore, still too early to *daven Shacharis*).

When one flies east, the opposite effect occurs as one is flying in the "opposite direction" of the sun and one encounters *zmanim* faster than usual. For aircraft passengers on an eastbound flight, sunrise occurs sooner than for those who remain in the city of origin. For example, in early March the sun rises in Boston just after 6:00 a.m. If Levi is in Boston at 10:00 p.m. he could say, "The sun will rise in 8 hours". However, if Yehuda's flight to London departs from Boston at 10:00 p.m., the sun rises 5 hours into the flight when it is only 3:00 a.m. in Boston. He has flown three time zones to the east, where the time below him (over the North Atlantic Ocean, south of Greenland) is 6:00 a.m.[3]

II. The Great Circle Route And Daylight In The Northern Regions

When one drives from west to east, one follows somewhat of a "straight line" (e.g., from Trenton to Lakewood, NJ on I-195 at 40° N). Long-haul flights, such as those from New York (41° N) to Tel Aviv (32° N), generally fly the Great Circle route over Iceland and northern Europe (60° N). Although The Great Circle route appears to be curved[4] on a map, in reality this route is actually "straight" and shorter in distance than flying a route traversing southeast over Spain and Gibraltar. Flying so far north, however, has a major impact on *zmanei hayom*. The impact can be explained as follows:

At the equator, the duration of daylight varies throughout the year by only 2 minutes, from 12 hours 6 minutes to 12 hours 8 minutes! As one travels north, the seasonal variation of daylight duration increases.[5] For example, in June in New York daylight is 15 hours long; in December, daylight lasts 9 hours. In Manchester, England the sun is in the sky during the summer for 17 hours but daylight lasts for only 7.5 hours in the winter. In Fairbanks, Alaska the sun is up in the sky for almost 22 hours in June, but less than 4 hours in December! Therefore, travelers taking night flights during the summer from North America to Tel Aviv or Europe will experience an unusually early sunrise as the flights go far north; likewise, winter flights will have an unusually late sunrise. North of the Arctic Circle (66.56° N), the sun can be above the horizon for 24 hours in the summer and below the horizon for 24 hours in the winter. Various *halachic* issues arise in these regions.[6]

III. Impact on Halacha

While one is in flight, the aircraft's position on the globe reflects the current time[7] and the time at the origin and destination airports is not relevant. For example, if at the aircraft's current position the sun has risen it is considered daytime for the passengers, even if it is dark at the origin or destination.[8] In general, when traveling westbound one davens fewer times inflight, if at all, because one encounters zmanim at a slow rate. Practically speaking, it is advisable to avoid westbound flights on fast days as the duration of daylight will likely be extremely long, causing one to fast additional hours. On eastbound flights, the zmanei tefila come and go more quickly

so one has a shorter window of opportunity to daven and recite Shema. When traveling across the Pacific Ocean in either direction, there are additional halachic issues related to the changing days when crossing the International Dateline.[9]

ChaiTables.com[10] calculates several types of inflight zmanim based on the Great Circle route and the assumption that most flight paths will follow this route. Their advanced interface can be used onboard the airplane in real time[11] to access more accurate zmanim based on the actual flight path. Air.MyZmanim.com calculates inflight zmanim as a range of possible times, which accounts for different possible flight patterns that can occur.[12] It is based on the history of the given flight route. However, no one can definitively predict the exact flight path for an upcoming trip. Therefore, one should ideally use these tools with the understanding of the "metzios" and the projected route to modify times with changes in the flight pattern.

Both ChaiTables and MyZmanim take possible modifications into account. For example, they indicate what happens if a flight takes off later than scheduled. Additionally, MyZmanim accounts for the different possible flight patterns by providing a time range for each *zman*. For example, a long eastbound flight in the summer may travel further north than anticipated and there may be no sunset. One may obtain a chart that projects times for a lengthy westbound journey; however, due to a variety of reasons (e.g., weather, air traffic, etc.) the flight path may change and head eastbound, thereby causing drastic changes to the *zmanim* data.[13] Therefore, it is advisable that one double check what is occurring. In some cases, this can be accomplished by looking out the window to verify a *zman*.[14] However, looking out the window will not help determine most specific *zmanim*.[15]

IV. Analyzing Flight Times

The clearest way to explain the "*metzios*" is by addressing various examples and sample times for such flights.

1) Eastbound Flights

a) Leaving late at night in the early winter – Depart New York 11:50 p.m. and arrive the next day in Tel Aviv at 5:30 p.m. Dawn comes less than 4 hours into the flight; sunrise is an hour after that. Although the plane flies east, sunrise is late (the local time on the ground is 8:00 a.m.) since the plane travels very far north. It should be noted that since the plane flies east, the *sof zman Krias Shema* and *tefila* come and go very rapidly. *Sof zman Krias Shema* is just one hour after sunrise (about 5 hours 45 minutes after takeoff), and *sof zman tefila* is only about a half hour after that. Therefore, one should look out the window shortly before the posted time for sunrise. If it is daytime, he should *daven* as soon as possible. If he can't *daven* at that time, he should say *Krias Shema* and then be sure to *daven Shemona Esrai* before the *sof zman tefila*. *Mincha Gedola* is about 7.5 hours into the flight, and sunset is 10 hours into the flight.

b) Same flight at the beginning of the summer (June & July) – This flight heads northeast so dawn comes less than 2 hours into the flight, and the sun rises one hour later. At this point, in New York the time would be 3:00 a.m. However, the time on the ground would be 4:00 a.m., and sunrise is extremely early as the plane has traveled north. *Sof zman Krias Shma* is at least 1.5 hours later (4.5 hours into the flight). *Sof zman tefila* is about 5 hours and 15 minutes after takeoff (at the earliest). One can *daven Mincha* about 8 hours hours after takeoff.

c) Flights taking off in the early afternoon may allow for easier time calculations without an inflight *zmanim* chart. For example, if one takes off from Newark at 1:30 p.m. in the winter and lands in Tel Aviv at 7:10 a.m. (the next day), one can *daven Mincha* before boarding and *Maariv* on the plane after it gets dark. The sun will rise around landing time, and one should *daven Shacharis* after arrival in *Eretz Yisroel*. In the summer, one could *daven Mincha* onboard shortly after takeoff and *Maariv* after it gets dark. One can *daven Shacharis* after landing (or onboard, an hour before landing).

2) Westbound Flights

a) Leaving late at night in the early winter – Depart Tel Aviv at 12:30 a.m. and arrive in New York at 5:40 a.m. During the entire flight, it is dark outside so no *tefilos* are required on board. This is true because one *davens Maariv* in *Eretz Yisroel* and *Shacharis* in New York when the sun rises, over an hour after his arrival.

b) Same flight in the early summer – *Daven Maariv* in *Eretz Yisroel*. Dawn will arrive a little after 3 hours into the flight. However, one can wait until landing to *daven Shacharis*. Since one[16] may not eat[17] after dawn[18] before *Shacharis*, one would not be allowed to eat for much of this flight without *davening Shacharis*. Furthermore, this would be an extremely difficult flight on a fast day (especially the 17th of *Tamuz*), since dawn comes early in the flight. At this point, one could not eat for the rest of the flight, as well as the full day after landing in New York, making this fast close to 24 hours long.

c) Flights that leave in the morning – Depart Tel Aviv at 10:40 a.m. and arrive in New York at 3:45 p.m. *Daven Shacharis* in *Eretz Yisroel* and *Mincha* in New York. No *tefilos* are required onboard. It is recommended to avoid such a flight on a fast day, since one would be required to fast before, during and after this 12 hour flight.

V. Polar Flights

Today, more commercial flights fly near the North Pole than ever before. An example is United #179 from Newark to Hong Kong, one of the longest of all Northern Hemisphere commercial flights originating in the United States. Flight records reveal that this 8,047 mile flight can fly close to the North Pole.[19] As indicated, an array of *halachic* issues arise when traveling in the Arctic. Additional issues may include going backwards in time – from early morning post-sunrise to pre-dawn, or from afternoon to morning – repeating or skipping a day due to crossing the International Dateline, and possibly flying in and out of *Shabbos* when traveling on Friday or Sunday.[20] While these issues are beyond the scope of our discussion, one should consult a *rav* before taking such flights.

VI. Plan Ahead

People often look for the cheapest deal on airline fares. When looking for flights, it is also worthwhile to take flight times and dates into consideration.[21] Just as we spend extra money on "*hidur mitzva*" (performing *mitzvos* in the nicest manner), it is typically worth a few extra dollars to book a flight that offers better *davening* times, and locations and the ability to *daven* with a *minyan*. Some non-stop flights are more ideal, as one may arrive at his destination earlier to *daven* with a *minyan*.

Sometimes a stopover may not be as easy as a non-stop flight, but it may allow for a better opportunity to *daven* properly. Scheduling a flight with the above in mind will allow us to fulfill *mitzvos* in the most ideal way.

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Footnotes:

1. Namely ChaiTables.com and Air.MyZmanim.com. Section III describes these important tools in detail.
2. i.e., astronomically what occurs
3. The effect of how north or south one flies will be addressed later.
4. This is due to the curvature of the earth. It may help to imagine what would happen if you drew a straight line on an orange and then flattened the orange onto a 2-dimensional surface. The straight line suddenly appears curved. This can also be demonstrated by running a string between two locations on a globe.
5. The same occurs as one travels south of the equator, except the longest days occur in December and the shortest days take place in June.
6. For a full discussion of *Shabbos* and *davening* times in Arctic regions, see "When Does One Pray When There Is No Day", https://www.star-k.org/articles/articles/travel/515/when-does-one-pray-when-there-is-no-day/.
7. *Igros Moshe Orach Chaim, chalek* 3, end of *siman* 96.
8. It should be noted that sunrise appears somewhat earlier and sunset somewhat later at aircraft altitudes than on the ground below. For example, early in the morning when inflight passengers see the sun rising just above the horizon from an aircraft window, on the ground below, the sun may still be below the horizon. This is because at an altitude of 35,000 feet at latitudes between the equator and 49° N, the sun can rise between 15-30 minutes earlier than on the ground (and set 15-30 minutes later). *Rav* Isser Zalman Meltzer, *zt"l* (*Ha'aros* at the end of *Sefer Bein Hashemashos*, pg. 158) and *Shevet Halevi* (3:27) are of the opinion that for those on the plane the time is determined as if they were on the ground (so it is still pre-sunrise if the sun has not yet risen for those below, on the ground). Rabbi Moshe Heinemann, *shlit"a*, Rabbinic Administrator of STAR-K, *paskens* like this, as well. One uses the time on the ground, when at "man made" higher altitudes (i.e., planes or buildings). However, when at "natural" higher altitudes (e.g., on top of mountains), one must take into consideration the higher altitude. This is critical when calculating *zmanim* charts for most cities, as they are above sea level. For a detailed discussion of this topic, as well as additional opinions regarding these cases, see *Dvar Yom* Chap. 9 (sections 12-17).
9. For a full discussion of the *halachic* issues related to International Dateline, see "A Traveler's Guide to the International Dateline" (https://www.star-k.org/articles/kashrus-kurrents/493/a-travelers-guide-to-the-international-dateline/).
10. The regular version – simple interface
11. Features include GPS positioning, map editing of routes to reproduce the actual route, and a *zmanim* calculator that can be applied to any location on the map.
12. One should be "*machmir*" (strict) in the time range provided and wait until he is certain the *zman* has arrived. For additional features on Air.MyZmanim.com, see footnotes #13 and #20. For zmanim while on the ground see MyZmanim.com here.

13. Therefore, MyZmanim provides travelers with two sets of zmanim data for bi-directional flights so they are prepared, whether the flight is traveling eastbound or westbound. Still, one most know which data set to use. As indicated, ChaiTables has an advanced interface which addresses such issues.

14. For example, if the chart says it is *tzais hakochavim*, look out the window to confirm that it is dark and then *daven Maariv*. If the chart states the sun has risen, look out the window to confirm that it is clearly daytime (see footnote #8). It should also be noted that some flights have darkened windows so that passengers can sleep. One should be cognizant of this and realize that on such flights, a "dark" window is not an accurate gauge of the actual time. A *rav* who is an experienced traveler related to me that he mistakenly *davened Maariv* when he saw a "full moon in the dark sky" and was later told that the windows on his Dreamliner flight were darkened and the "full moon" was actually the sun!

15. Determining various *zmanim* by looking out the window is not simple. For example, *alos hashachar* is difficult to confirm. The exact time of sunrise for *vasikin* is virtually impossible to confirm while flying. *Mincha Gedola* is more difficult to confirm by looking out the window and requires understanding the plane's direction and location of the sun. Generally, if the sun appears out the window southwest, west or northwest of the plane one can *daven Mincha*.

16. This halacha applies to men. Women may eat after dawn once Brachos are recited.

17. One may, however, drink most beverages after dawn or even after sunrise.

18. Certain eating restrictions before Shacharis begin every day a half-hour before dawn. See Mishna Brura 89:27.

19. The exact route of this 15 hour flight can change slightly, causing possible *halachic* ramifications. For example, if the above flight reaches 89° N (1° from the North Pole) but stays on the European side of the North Pole, the flight technically goes east and does not cross the Dateline so no day is skipped. If it reaches 89° N but stays on the Alaskan side of the North Pole, the flight is going west and crosses the Dateline, "skipping an entire day". The "eastbound" and "westbound" routes above come within 140 miles of each other, yet the *halachos* regarding these flights will be different.

20. Because of these issues, MyZmanim prepares the traveler as best as possible by providing important additional data (e.g., when the aircraft enters and leaves the Arctic, when it crosses the Dateline, etc.).

21. People with non-refundable tickets for flights involving *halachic* difficulties (e.g., how to light the menorah on *Chanukah*, how a *bechor* can partake in a *siyum* on *Erev Pesach*, etc.) often have *shaalos*. Many of these issues can be avoided with a calendar and proper advanced planning.