

STARPORT (SOLUTION)

by Ong Kah Kien

The moving display in this puzzle solution is a [split-flap display](#) or Solari board commonly found in airports to display flight information. There are 10 distinct flights listed (in order of city names as their initial flight timings are all 0000hrs), with all of them being delayed and their flight timings changed multiple times. The board goes through 35 state changes in total. In each iteration, only the timing for 1 flight changes, but some of the other rows in the board could also be refreshed, so as to reorder all the flights by timing (and by city name where timings are the same). The order of the timing changes follow a specific sequence of the 10 flights, which can be observed from the first two rounds of changes (flights have different number of total changes, so some may cease changing before others).

The first step is to use first two columns of the board (i.e. the airline names alongside their respective flight numbers) in the given order. The flight numbers are all 3(non-zero)-digit numbers, while the airline names (mostly fictitious) are all shown spelt out in full. Using the 3 digits of the flight number to index into each corresponding airline name extracts trigrams, which read in order spell TIME FOR SHIFTS TO IATA AIRPORT CODE. [IATA airport codes](#) are (largely) unique 3-letter identifiers used for airports. “Shifts” is a reference to letter shifts, which is thematic to the incremental shifts observed on the split-flap display. “Time for” is a pun to instruct solvers to use the different delayed flight timings as the letter shifts to the IATA airport codes. All the flight timings have 3 consecutive non-zero digits, similar to the flight numbers, and matching the number of letters in the IATA codes. So the 3 non-zero digits in a flight’s changed timings can be used as corresponding shifts to each letter of an IATA code.

Each of the destination cities on the display are major cities that have one main international airport. Performing the letter shift for the first delayed timing for each flight on the IATA airport code for each of these gives the IATA airport code for another unique airport (referencing where the delayed flight was rerouted to, as hinted in the flavortext). The letter shift for the next delayed flight timing can then be performed on the IATA airport code for this airport to get another airport, and so on. All the airports can be found using the [IATA airport code search engine](#) on their website, or using any online search.

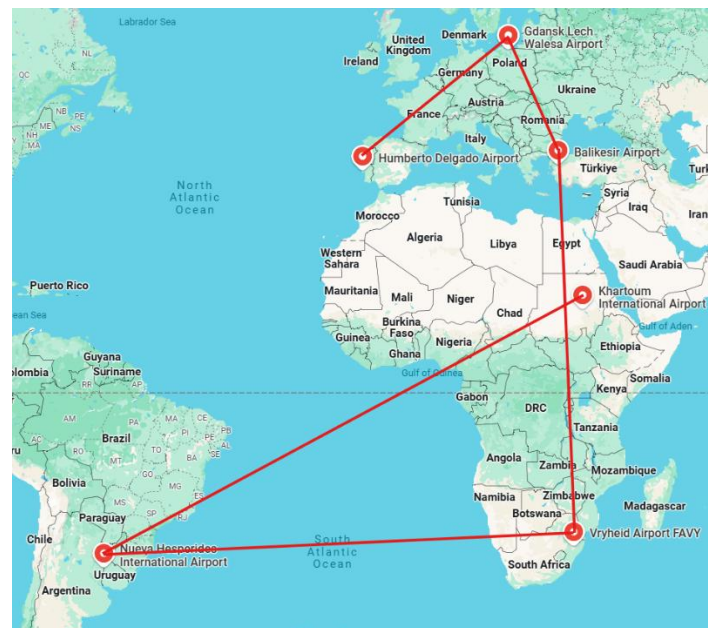
The chain of airports identified by the original and shifted IATA airport codes for each flight can be marked out on a map. And the route connecting the chain of airports in order for each flight traces out a letter on the map. The letters, in order of the timing change sequence, spell out the thematic answer for this puzzle **TARDY PLANE**.

The tables on the following pages summarize for each flight (in order of timing change sequence), the changed timings, the shifted IATA airport codes, their corresponding airports and locations. An image after each table marks out those airports on a map, and shows the letter traced out by connecting them.

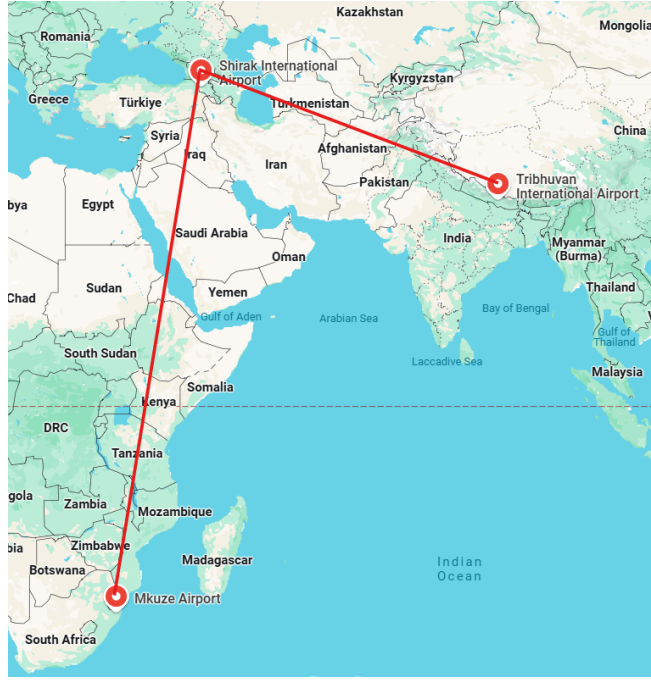
Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Kazakhstan	Almaty International	ALA	0215	2	1	5
France	Chambery	CMF	0115	1	1	5
Ukraine	Dnipro International	DNK	0935	9	3	5
S.Africa	Kruger Mpumalanga International	MQP				



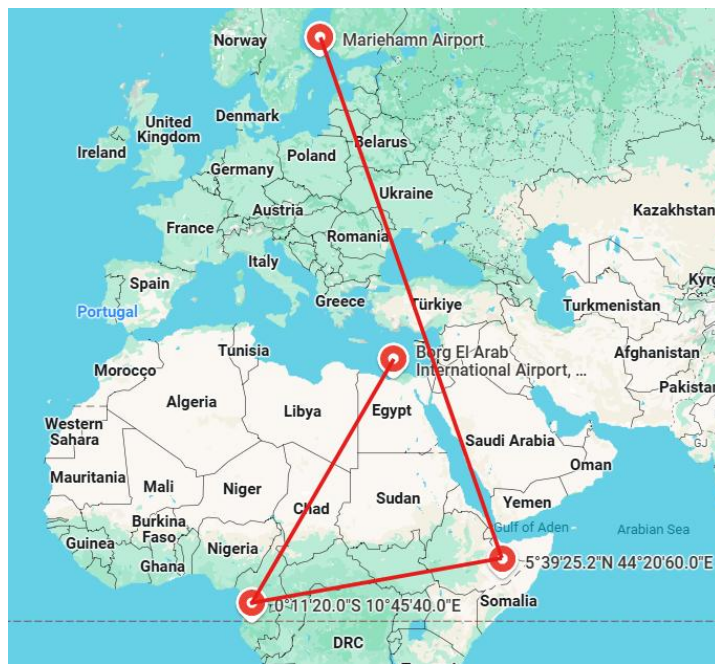
Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Sudan	Khartoum International	KRT	0825	8	2	5
Uruguay	Nueva Hesperides International	STY	0355	3	5	5
South Africa	Vryheid	VYD	0615	6	1	5
Turkiye	Balikesir	BZI	0545	5	4	5
Poland	Gdansk Lech Walesa	GDN	0555	5	5	5
Portugal	Humberto Delgado	LIS				



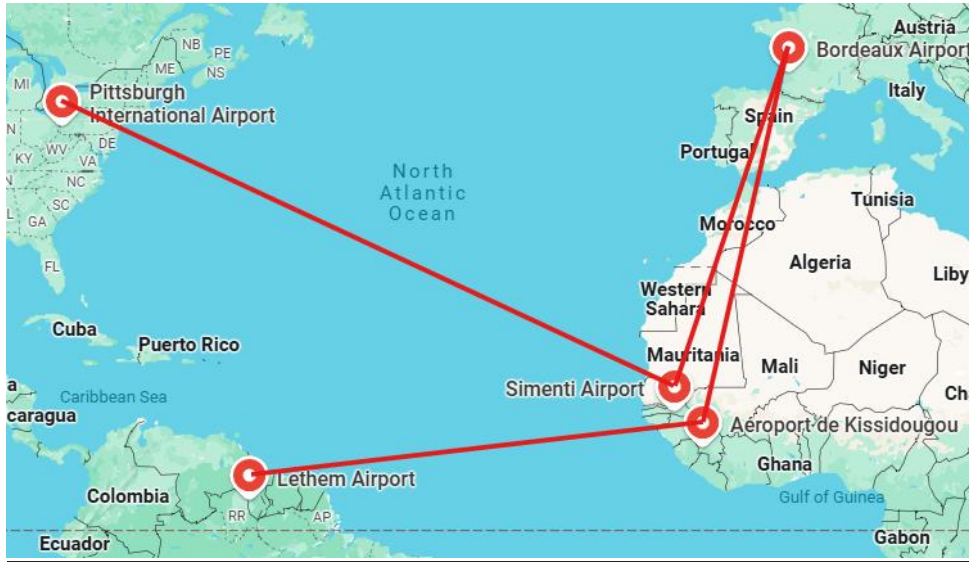
Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Nepal	Tribhuvan International (Kathmandu)	KTM	1310	1	3	1
Armenia	Shirak Gymri	LWN	1330	1	3	3
South Africa	Mkuze	MZQ				



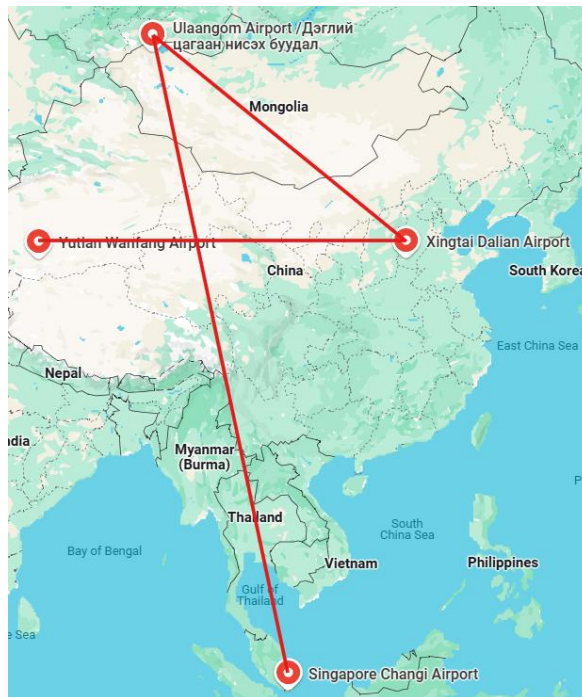
Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Egypt	Borg El Arab International (Alexandria)	HBE	0325	3	2	5
Gabon	(Ndjole) Ville	KDJ	0125	1	2	5
Ethopia	Kelafo East	LFO	1220	1	2	2
Finland	Mariehamn	MHQ				



Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
USA	Pittsburgh International	PIT	0345	3	4	5
Senegal	Simenti	SMY	0925	9	2	5
France	Bordeaux-Merignac	BOD	0945	9	4	5
Guinea	Kissidougou	KSI	1140	1	1	4
Guyana	Lethem	LTM				

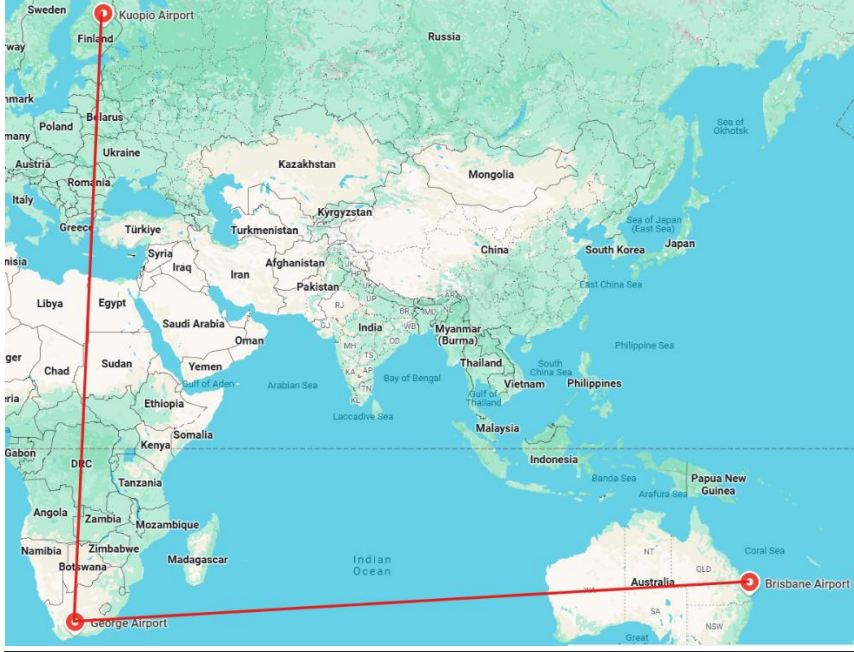


Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Singapore	Changi International	SIN	2310	2	3	1
Mongolia	Ulaangom	ULO	0325	3	2	5
China	Xingtai Dalian	XNT	1630	1	6	3
China	Yutien Wanfang	YTW				



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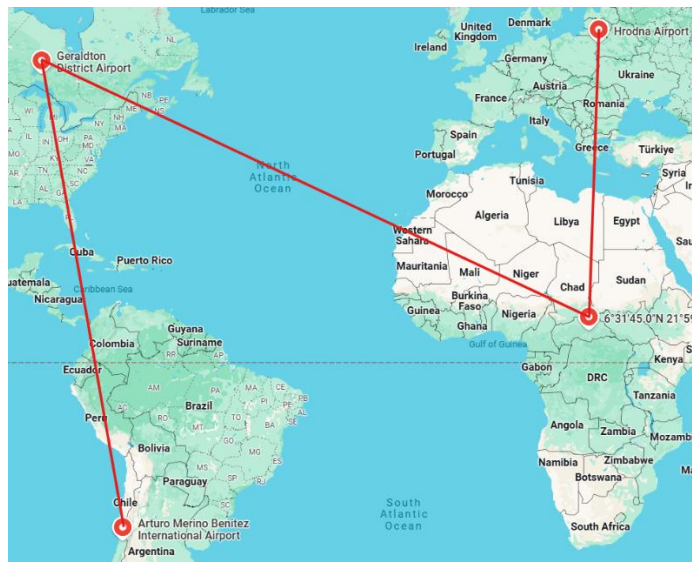
Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Australia	Brisbane	BNE	0545	5	4	5
South Africa	George Airport	GRJ	0435	4	3	5
Finland	Kuopio	KUO				



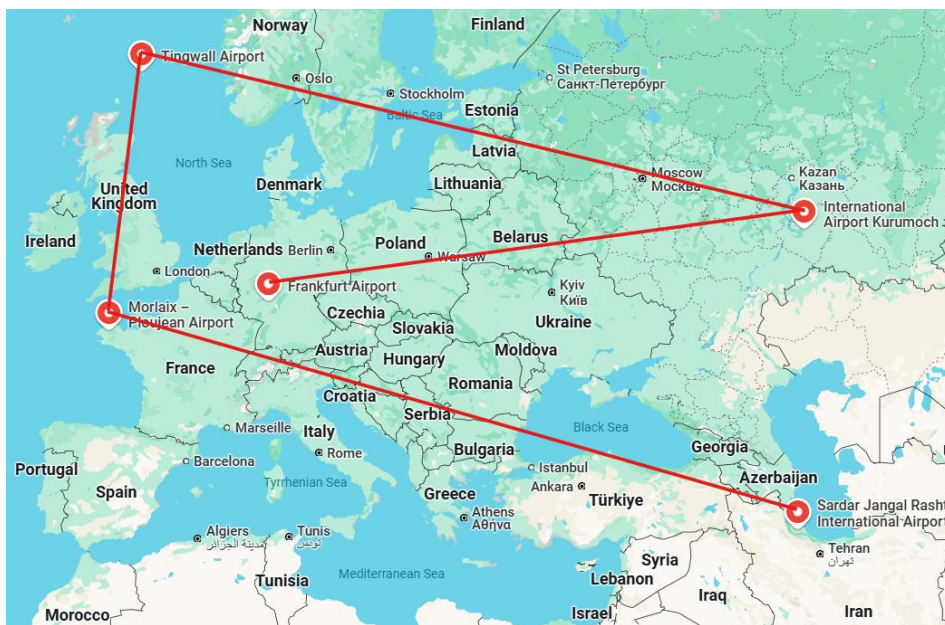
Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Libya	Benina International (Benghazi)	BEN	1110	1	1	1
Brazil	Confresa	CFO	1330	1	3	3
Ethopia	Dire Dawa International	DIR	1220	1	2	2
Sweden	Eskilstuna	EKT	0415	4	1	5
Scotland	Islay	ILY				



Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Chile	Arturo Merino Benitez International (Santiago)	SCL	0645	6	4	5
Ontario	Geraldton Greenstone Regional	YGQ	0325	3	2	5
Central African Republic	Bria	BIV	0555	5	5	5
Belarus	Hrodna (Grodno)	GNA				



Locations	Airports	IATA codes	Delayed timings	3-letter shifts to get next IATA code		
Germany	Frankfurt International	FRA	0535	5	3	5
Russia	Kurumoch International	KUF	0125	1	2	5
Scotland	Lerwick/Tingwall	LWK	1130	1	1	3
France	Morlaix-Ploujean	MXN	0535	5	3	5
Iran	Sardar Jangal Rasht International	RAS				



Constructor's notes:

The idea for this puzzle came from the answer, which referenced the dreaded and familiar flight delays. The split-flap display has always been an intriguing (but disappearing) element of airports, with its iconic and soothing clicking sounds as the flight information updates on the board. So I wanted to write a puzzle using this artifact as a theme, while at the same time making its operation a central theme to the puzzle idea. The incremental changes of the display characters made using letter shifts a natural choice for the thematic main step. However, I decided to stay true to an actual split-flap display in using alphanumeric rollers (which also increased the flip duration), rather than using separate ones for the alphabet to align more with the letter shifts. There was also a lot of available information on the display to make use of, so 3-digit flight numbers were used to extract a clue phrase from the airline names (and also to hint the 3-digit letter shifts for the main step).

The final step of tracing out letters on a map for each (rerouted) flight also made thematic sense. But from the puzzle construction angle, this was extremely difficult to do, despite what seems like a huge pool of airports to select from. There were constraints that the flight timings needed to be valid, and resembling reasonable flight timings ending in 0 or 5. So this limited the range of potential IATA airport codes for each successive airport, making the letter tracings hard. I also needed to start from a sizeable city with only one main international airport. But in the end, I came up with a good strategy of going for airports which were far apart, to maximize the likelihood of finding the next one that lay along the required path. I also chose starting points with a rough idea to maximize the choices of where the possible intermediate airports could lay for particular letter tracings. The construction process took a while, and was not helped by IATA airport code lists which were not up-to-date. But in the end, I was glad to be able to get pretty decent tracings for all the letters, and with a good spread of cities across the map.

The split-flap display in the puzzle was implemented and built on top of code largely based on a JQuery function originally by Maxime Cousinou.