Time Table of Flights

The initial conditions of three cargo containers are mentioned in the Part . We can know a whole flight is less than two hours (flying period is less than one hour, and charging period is one hour); thus, we set two hours as a flight period. There are ten hours (8:00 − 18:00) per day, during which the drones can fly. We use 30 Type B drones (initially in Cargo Container C) to detect the roads. They will detect all the areas which they are able to fly to and come back two hours by two hours (five times per day); thus, we do not list them in the time table. Our aims of setting the time tables are:

Try to deliver the medicines as soon as possible;

Try to completion at same time for the five hospitals.

Day One

Departure point / Time	Cargo Container A	Cargo Container B	Cargo Container C
8:00 - 10:00	42* D(4*MED2)->②	18* B(2*MED3)->⑤ 20*B(2*MED3)->A 1*B(1*MED3)->A	30*B(2*MED1)->A
10:00 – 12:00	42* D(4*MED2)->③ 21*B -> B 30*B -> C	12*B(1*MED1+1*MED3)->④ 6*B(2*MED1) ->④	/
12:00 – 14:00	42* D(4*MED2)->②	16*B(1*MED1+1*MED3)->④	30*B(2*MED1)->A
14:00 – 16:00	42* D(4*MED2)->③ 30*B -> C	8*B(2*MED1) ->④ 15*B(1*MED1+1*MED3)->⑤	/
16:00 – 18:00	5* D(4*MED2)->② 5* D(4*MED2)->③ 1* D(3*MED2)->② 1* D(3*MED2)->③ 24*D(1*MED1+1*MED3)->② 6* D(2*MED1)->③	(*from this time, there will be 21 times (count this time in) that they have the same arrangement of flights) * The 24th time (on Day 5) 11*B(2*MED1) ->④ 5*B(2*MED1) ->④ 1*B(1*MED1) ->④	3*B(2*MED1)->A 27*B(2*MED1)->①

After Day One, each hospital has medicines which can maintain at least

12 days.

Day Two

Departure point / Time	Cargo Container A	Cargo Container B	Cargo Container C
8:00 - 10:00	6* D(2*MED1)->③ 3* B(2*MED1)->③ 36*D(1*MED1+1*MED3)-> ② (these 45 flights are marked as☆)	* The 25th time (on Day 5): 26*B(1*MED1+1*MED3)-> ⑤	27*B(2*MED1)->A
10:00 – 12:00	27*B->C ☆		/
12:00 – 14:00	☆		27*B(2*MED1)->A
14:00 – 16:00	27*B->C ☆		/
16:00 – 18:00	☆		6*B(2*MED1)->A 4*B->A 17*B(2*MED1)->①

After Day Two, every period's flights are cyclic:

Departure from Cargo Container A: 11*B(2*MED1)-> ③ ; 2*B(1*MED1+1*MED3)->②; 42*D(1*MED1+1*MED3)->② each time. After looping 11 times, the 22th time (on Day 5)'s flights are: 7*B(2*MED1)-> ③ ; 1*B(1*MED1)->③; 30*D(1*MED1+1*MED3) ->②

Departure from Cargo Container C: 17*B(2*MED1)->① each time. After looping 7 times, the 18th time (on Day 4)'s flights are: 16*B(2*MED1)->①; 1*B(1*MED1)->①

As the result, after Day 5(the last day we still need to deliver medicines) all hospitals have medicines which can keep 359 days.

(*Notes:

①~⑤ represents the five hospitals: ① Hospital Pavia Arecibo, ② Puerto Rico Children's Hospital, ③ Hospital Pavia Santurce, ④ Hospital HIMA, ⑤ Caribbean Medical Center.

A, B and C represent Cargo Container A, B and C.

N * Type X (n * MEDi + m * MEDj) -> Location L represents flights that N Type X drones fly to location L with each carrying n MEDi and m MEDj. (e.g.

42* D(4*MED2)->② means 42 Type D drones fly to ② with each carrying 4 MED2;

20*B(2*MED3)->A means 20 Type B drones fly to Cargo Container A with each carrying 2 MED3;

A flight which does not carry any medicines represented with no bracket.)

A flight to the hospitals will fly back to the original place, while a flight to another cargo container won't.

Every drone always carries a cargo bay, we do not consider cargo bays separately anymore.)