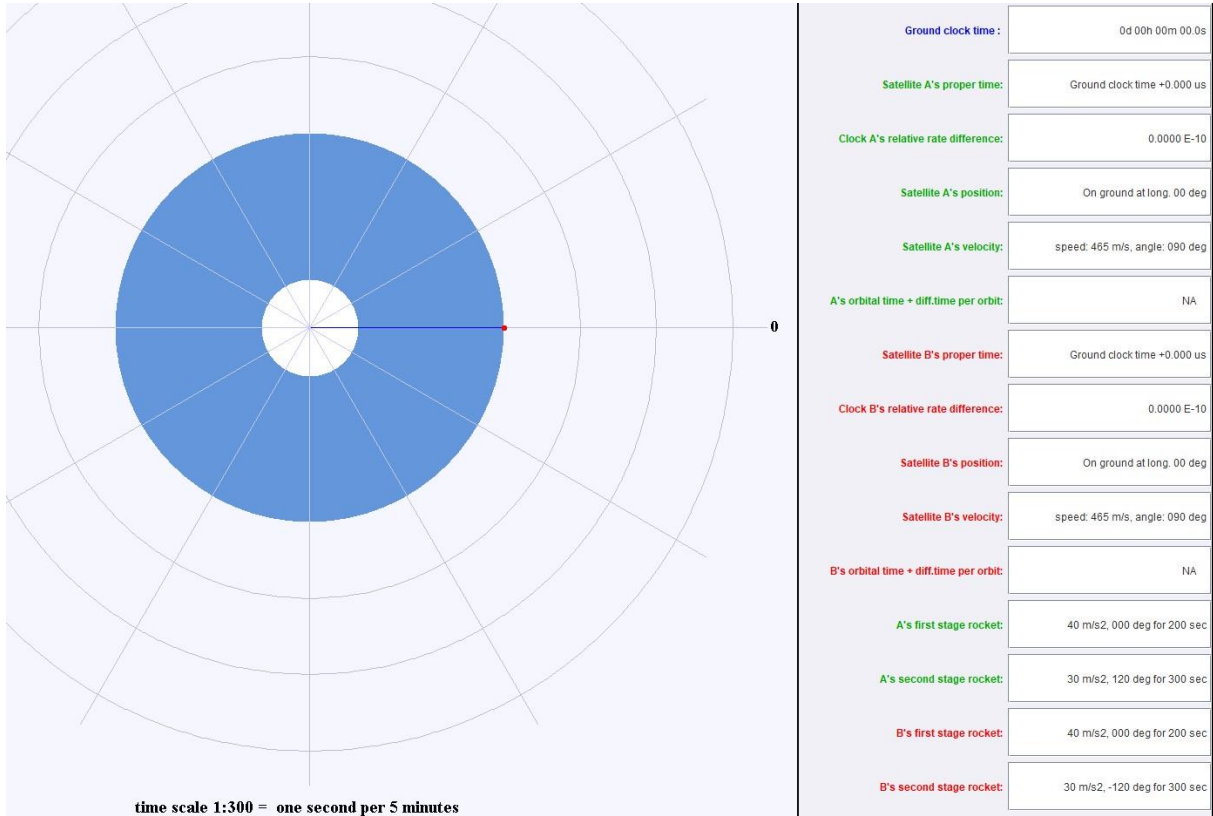


**Screenshots of a run of the simulation:** <https://paulba.no/Satellites.html>

The scenario: "Rockets in opposite direction"

Before launch:

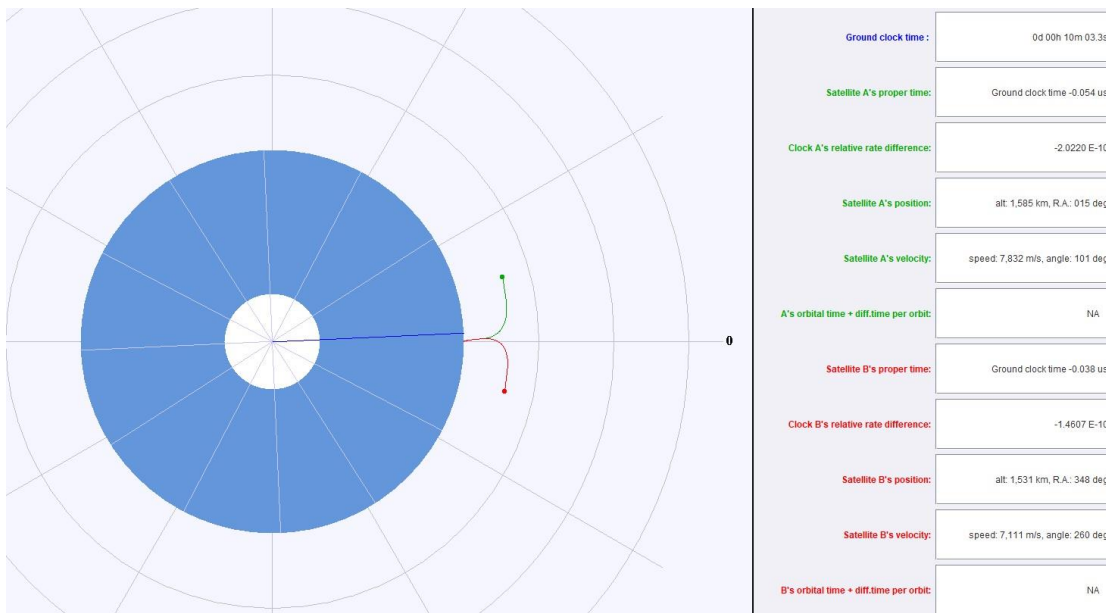


Both rockets (Green A and Red B) are stationary at the ground with eastward speed 465 m/s in the non rotating Earth centred frame of reference (ECI-frame).

The accelerations of the rockets will be as shown below:

A's first stage rocket:	40 m/s <sup>2</sup> , 000 deg for 200 sec	Vertical
A's second stage rocket:	30 m/s <sup>2</sup> , 120 deg for 300 sec	120° east of vertical
B's first stage rocket:	40 m/s <sup>2</sup> , 000 deg for 200 sec	Vertical
B's second stage rocket:	30 m/s <sup>2</sup> , -120 deg for 300 sec	120° west of vertical

10 minutes after launch:



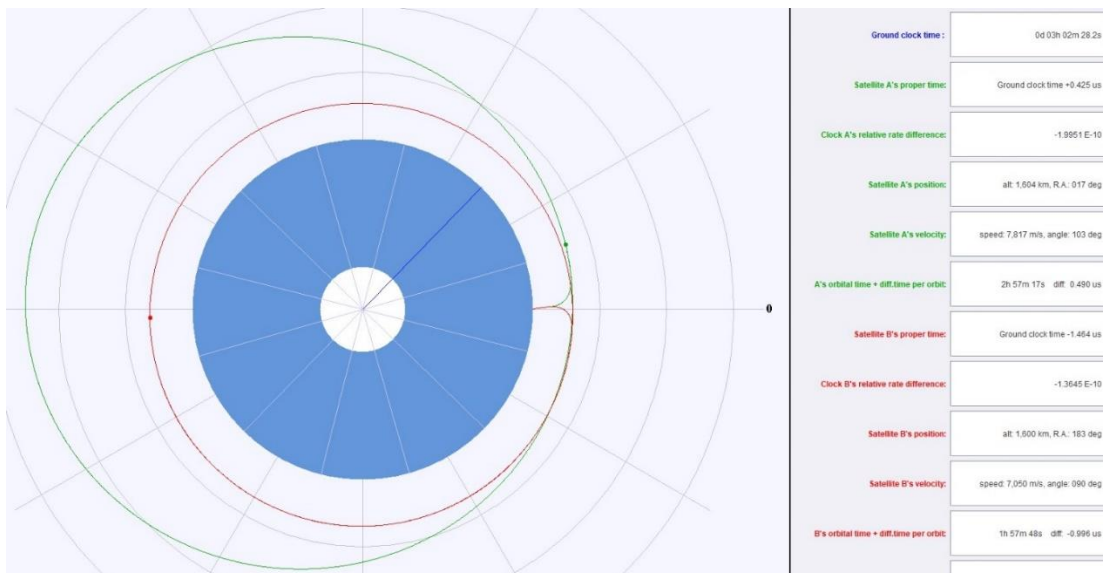
The green rocket A is moving roughly eastwards with the speed 7832 m/s in the ECI-frame and (7832-465) m/s = 7367 m/s relative to the ground.

Rocket B is moving roughly westwards with the speed 7111 m/s in the ECI-frame and (7111+465) m/s = 7576 m/s relative to the ground.

Note that the rockets have almost the same speed relative to the ground.

This is as expected, since the accelerations are symmetrical relative to the ground.

In "steady state":



The green rocket A is in a much higher orbit than the red rocket B.

The period of rocket A is 10637 seconds, while the period of rocket B is 7068 seconds.

A clock in rocket A will gain 425 ns per orbit compared to a clock on the ground.

A clock in rocket B will lose 996 ns per orbit compared to a clock on the ground.