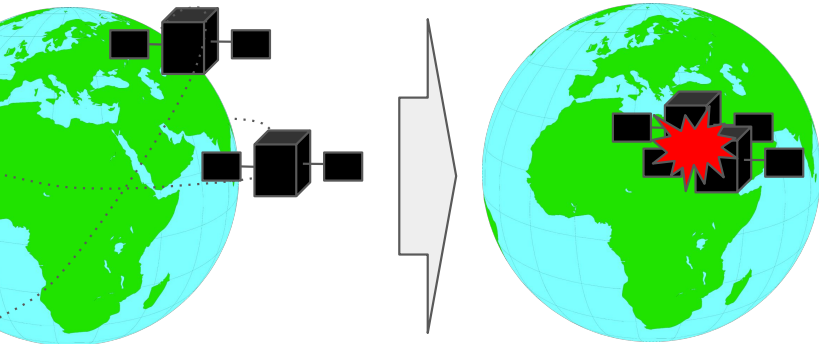


Parallelize Satellite Orbital Collision/Link Detection

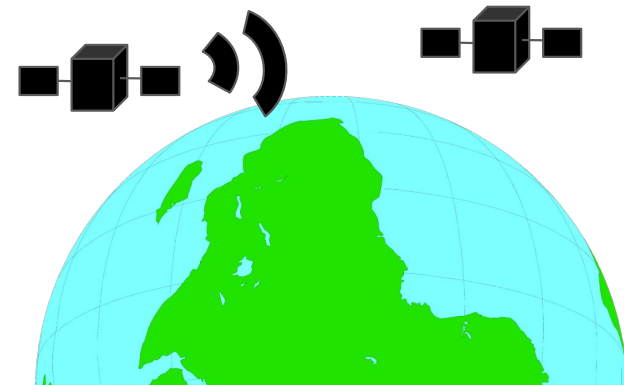
BU EC 526
Spring 2019
March 28, 2019

By David Payne

Problem 1: Satellites Collide



Problem 2: Satellites Want to Talk

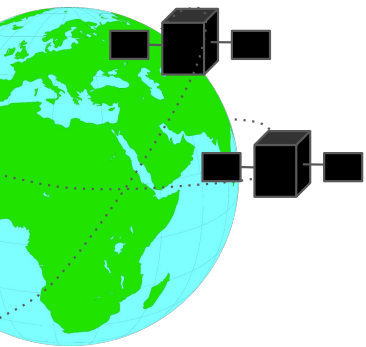


Current State: Generally calculated serially - one satellite trace at a time, even in \$\$\$\$ programs

Parallelize Satellite Orbital Collision/Link Detection

By David Payne

Satellite Two-Line Elements (TLE)



TLE Includes:

- Inclination
- RAAN
- Eccentricity
- Argument of Perigee
- Mean Anomaly
- Mean Motion

	Time Step 1	TS 2	TS 3
Satellite 1	Position	...	...
Satellite 2	...	...	...
Satellite 3	...	...	...

Time Step 2	Satellite 1	S 2	S 3
Time Step 1	Satellite 1	S 2	S 3
Satellite 1	Distance (0)	...	...
Satellite 2	-	0	...
Satellite 3	-	-	0

Parallelize each satellite's position calculations

Can increase or decrease accuracy of position predictions e.g. add solar pressure

Parallelize each time step calculations and each cell's calculation.

Highlight distances that are above/below a given threshold (e.g. red for likely collision, green for link budget closes)

May be able to improve efficiency with checks, e.g. don't calculate collision distance if very different mean motions