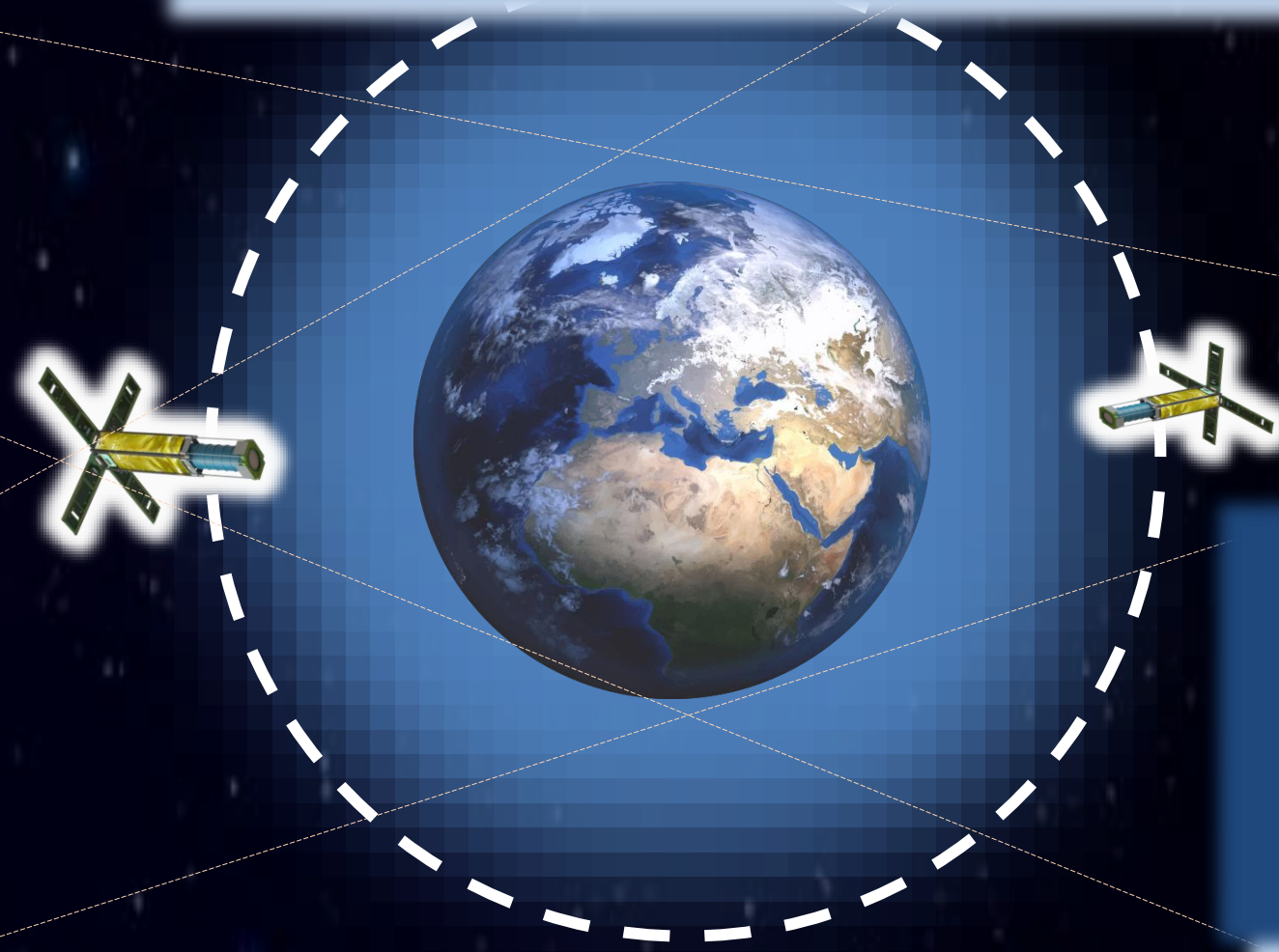


SATELLITE Orbit & Thermal Consideration

People on Earth's surface see the Sun once a day.
However, Satellite can see the Sun 14x times a day

Satellite surface temperature may be $>100^{\circ}\text{C}$, when facing the Sun



Satellite surface temperature may drop to $<-40^{\circ}\text{C}$ at Eclipse.
SUN is blocked by earth.

There is no air in Space.

- There is no **Convection** Heat Flow (ie Fan don't work)
- Satellite can only make use of **Conduction** and **Radiation** to control the heat flow.

Satellite designer must ensure good thermal control.

→ Ensure Electronic and Parts to operate in their desired temperature range.

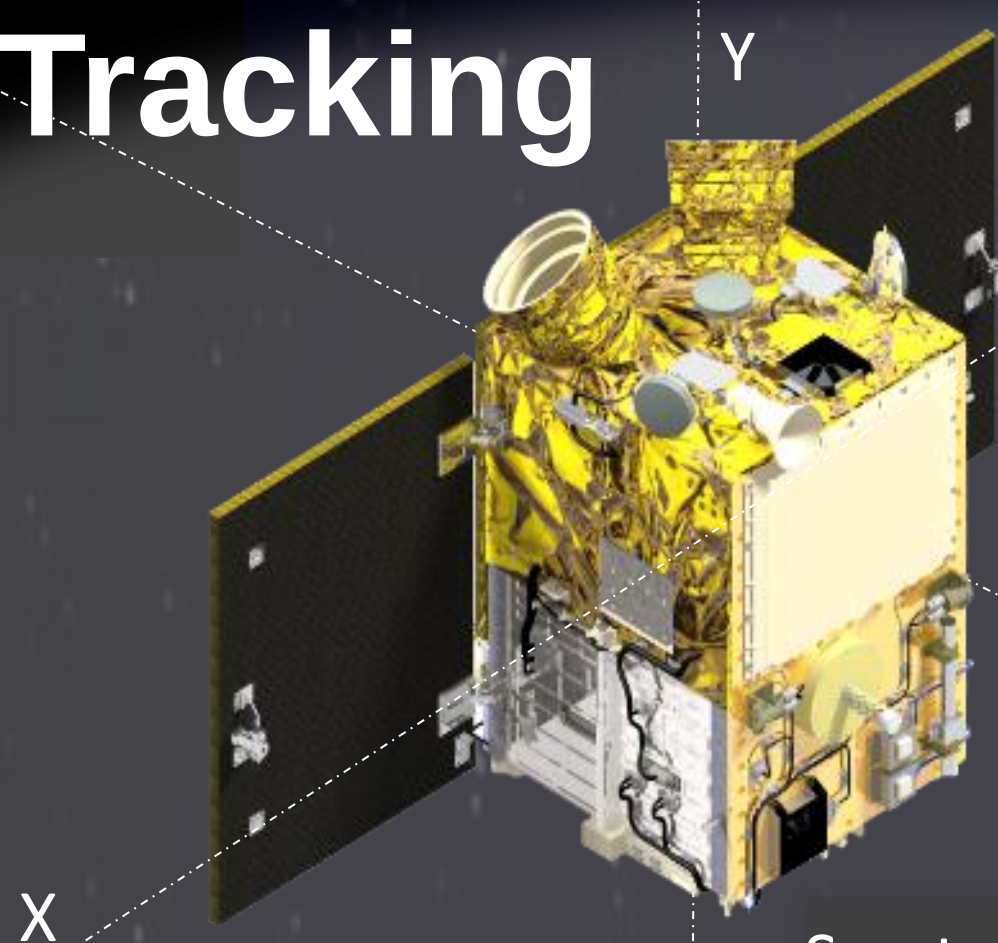
One of the passive thermal control method is:

- MLI (Multi-Layers Insulation)

This is the "Golden Covering" seen on most satellites.

Heater is a form of active thermal control.

Sun Tracking



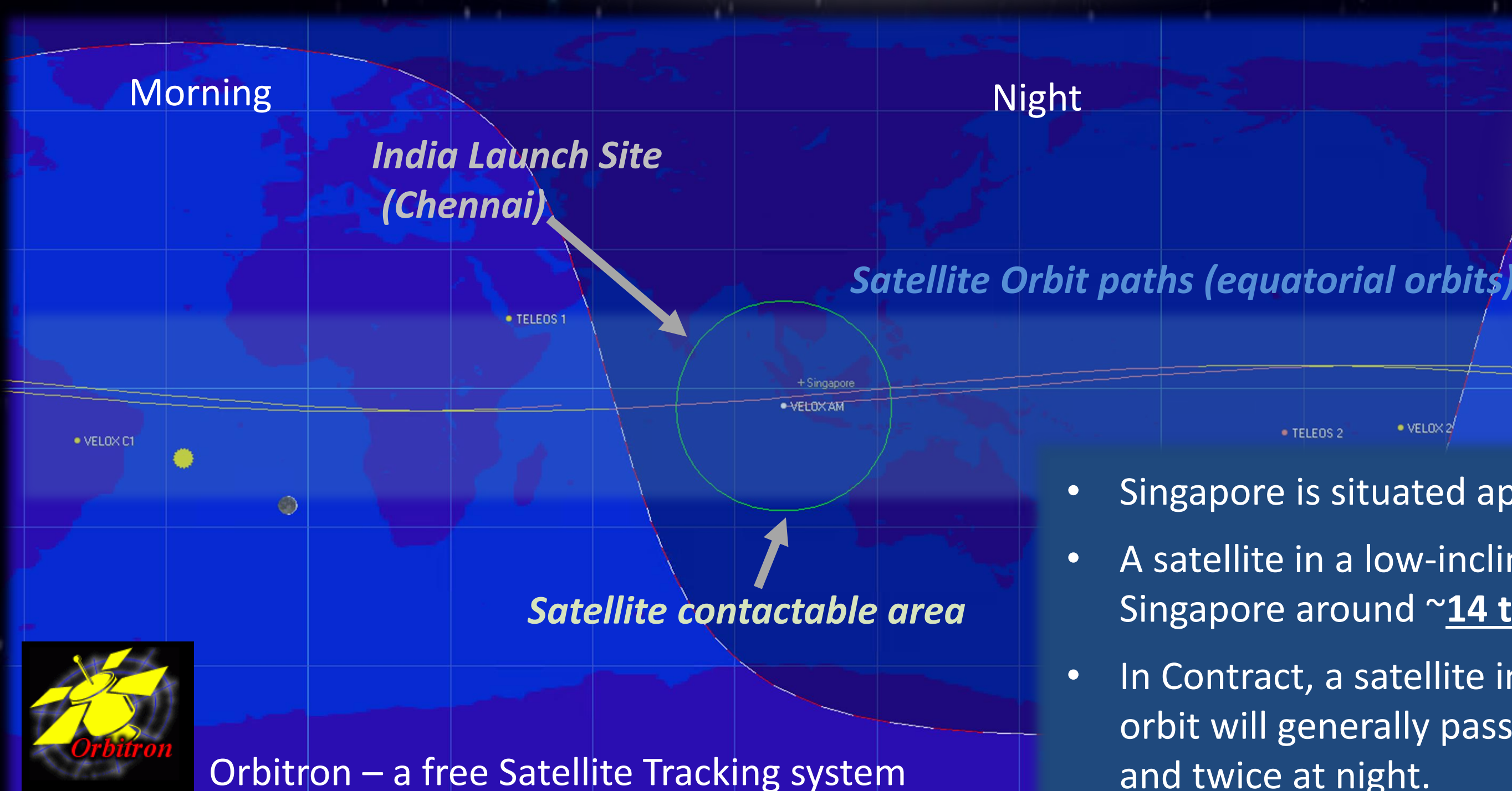
Orbit Path

Earth Pointing

Sun tracking – control the satellite orientation (Attitude) so that solar panel will have maximum sun energy.

Earth pointing (usually the Z axis) – eg for image recording purposes.

Orbit path – Direction of flight (usually the X axis.)



Orbitron – a free Satellite Tracking system



- Singapore is situated approximately 1° north of the equator.
- A satellite in a low-inclination or **equatorial orbit** will pass over Singapore around **~14 times a day**.
- In Contrast, a satellite in a Sun-synchronous or a higher-inclination orbit will generally pass over Singapore about twice during the day and twice at night.

