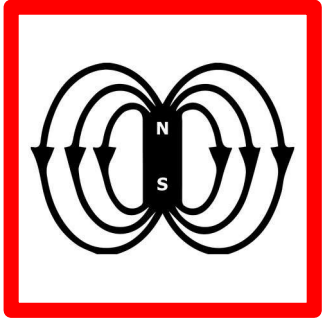


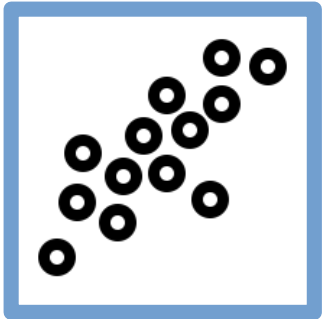
Warm-Up Exercise



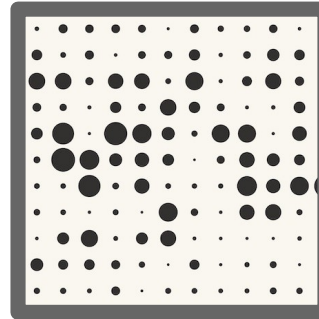
Geomagnetic
(sub)storm



Solar flare



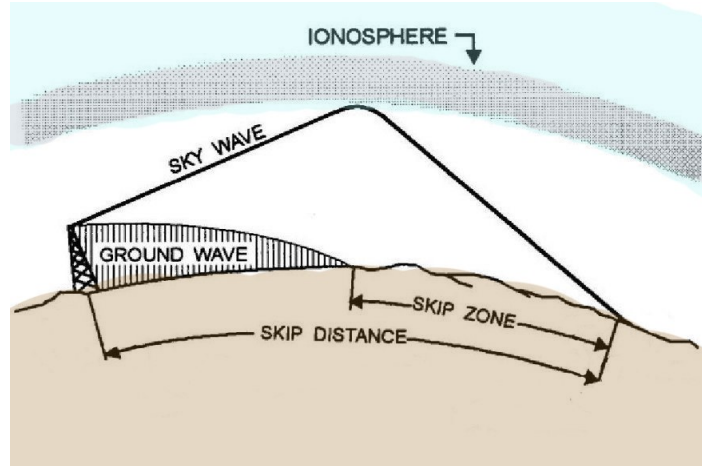
Particle
event



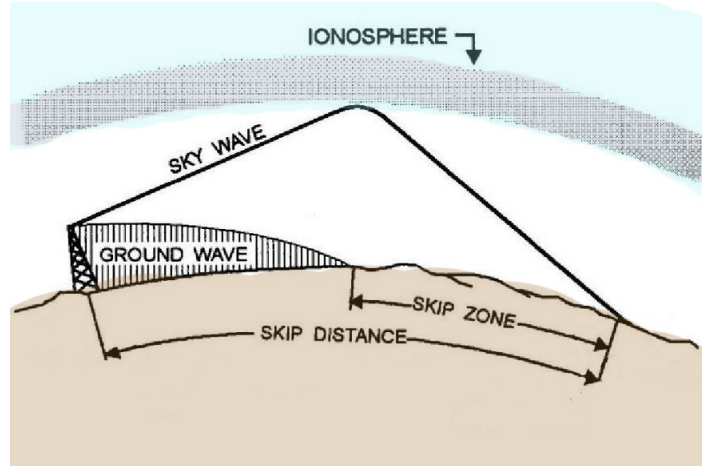
Small scale
irregularities

Which phenomena are (generally) important for each technology/application?

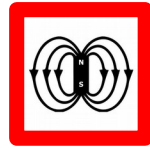
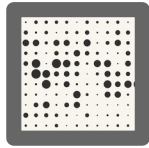
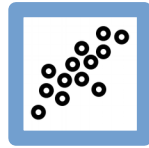
1. HF communication



1. HF communication



Important:


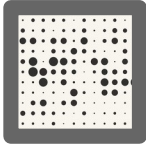


2. GNSS positioning



2. GNSS positioning



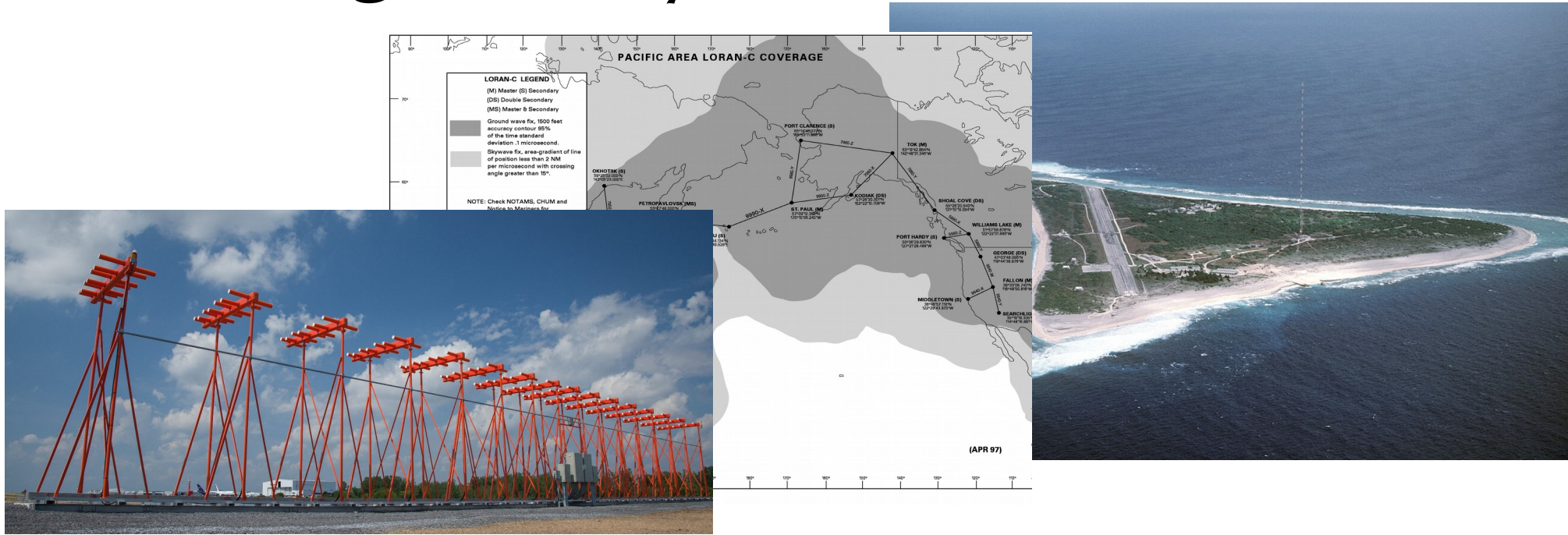
Important:  

Note: *D* layer enhancements can be detected by GNSS, but generally not important for applications.

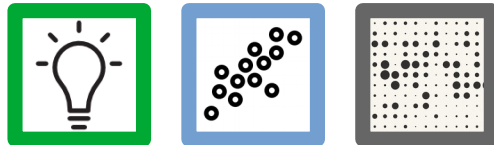
3. Navigation by fixed radio beacons



3. Navigation by fixed radio beacons

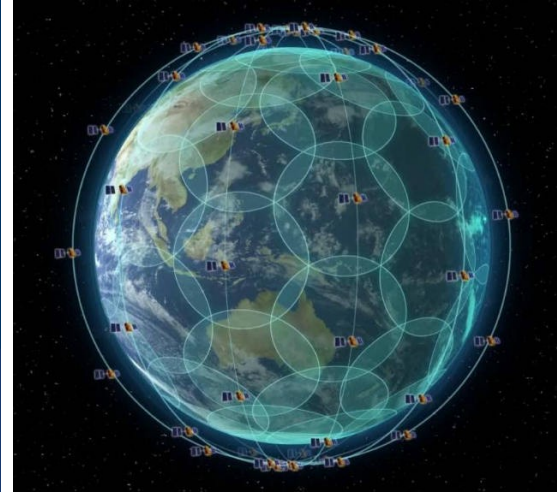
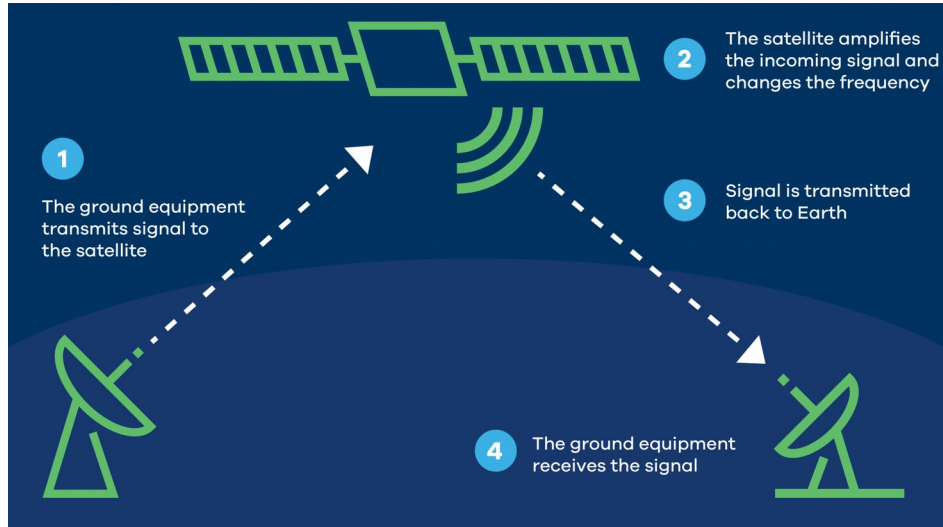


Important:

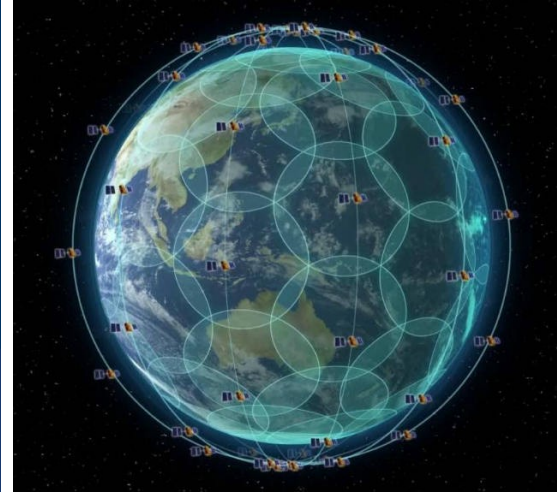
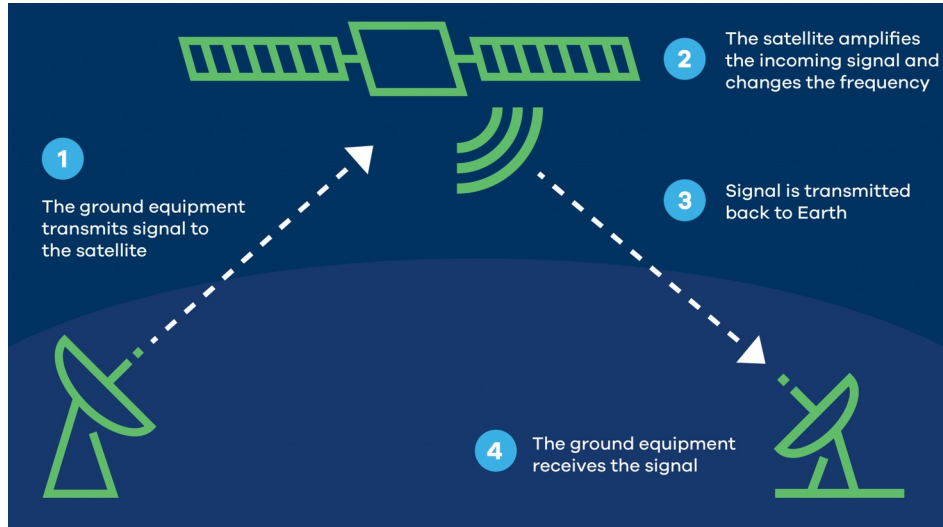


Note: Impacts will depend on the frequency band used (no impact in case of line-of-sight operations).

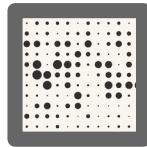
4. Satellite communication



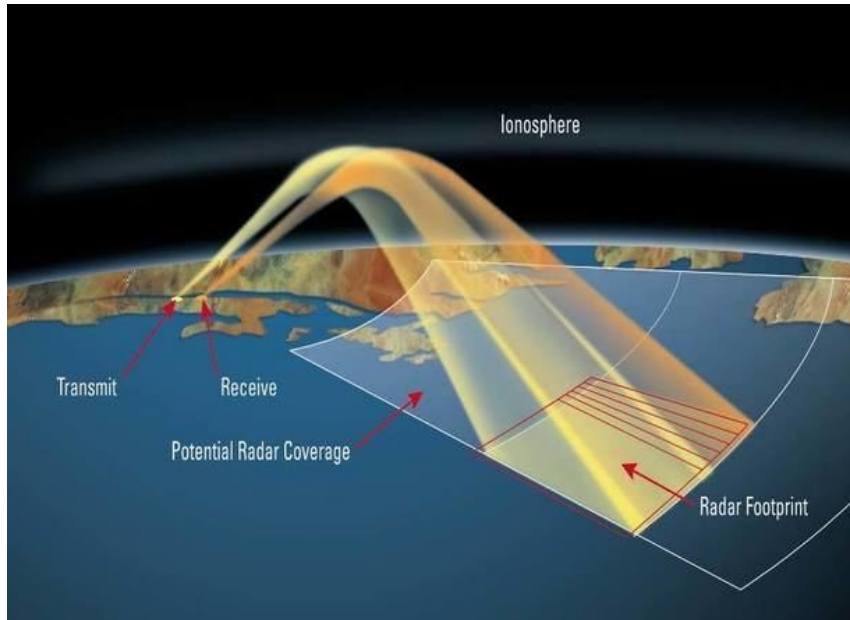
4. Satellite communication



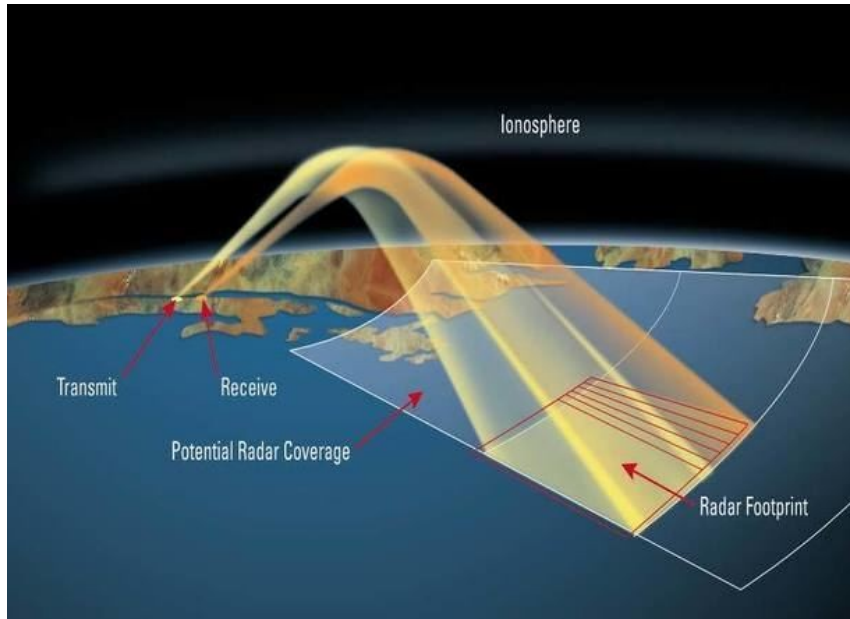
Important:



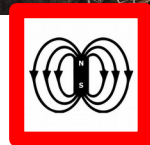
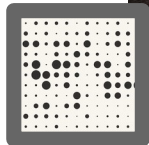
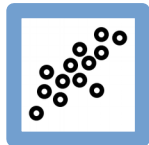
5. Over-the-horizon radar



5. Over-the-horizon radar



Important:



Note: Usually absorption and MUF depletion can be mitigated by changing frequency and using high power Tx.

6. Air traffic control radar



6. Air traffic control radar



Important: none

Note: Solar radio bursts can affect ATC, but not via the ionosphere

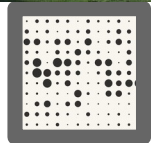
7. Radio astronomy



7. Radio astronomy

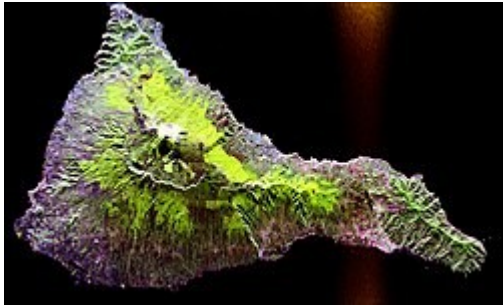
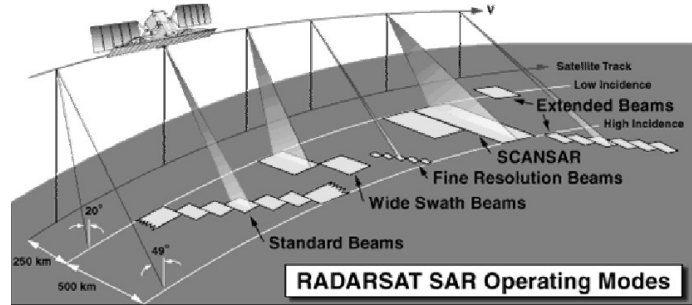


Important:

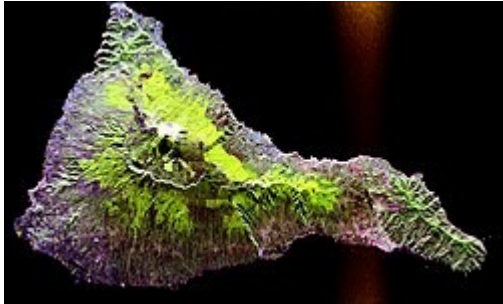
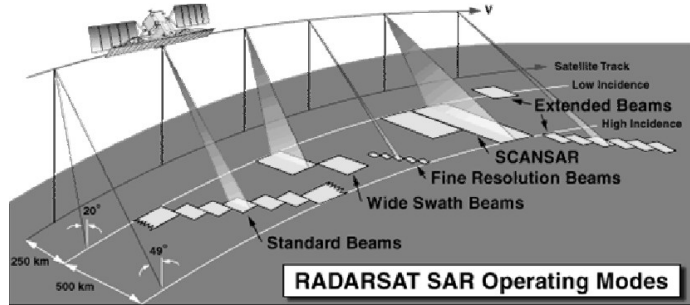


Note: Absorption is only relevant for the lower frequency bands.

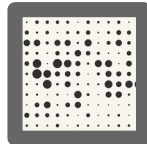
8. Synthetic aperture radar



8. Synthetic aperture radar



Important:

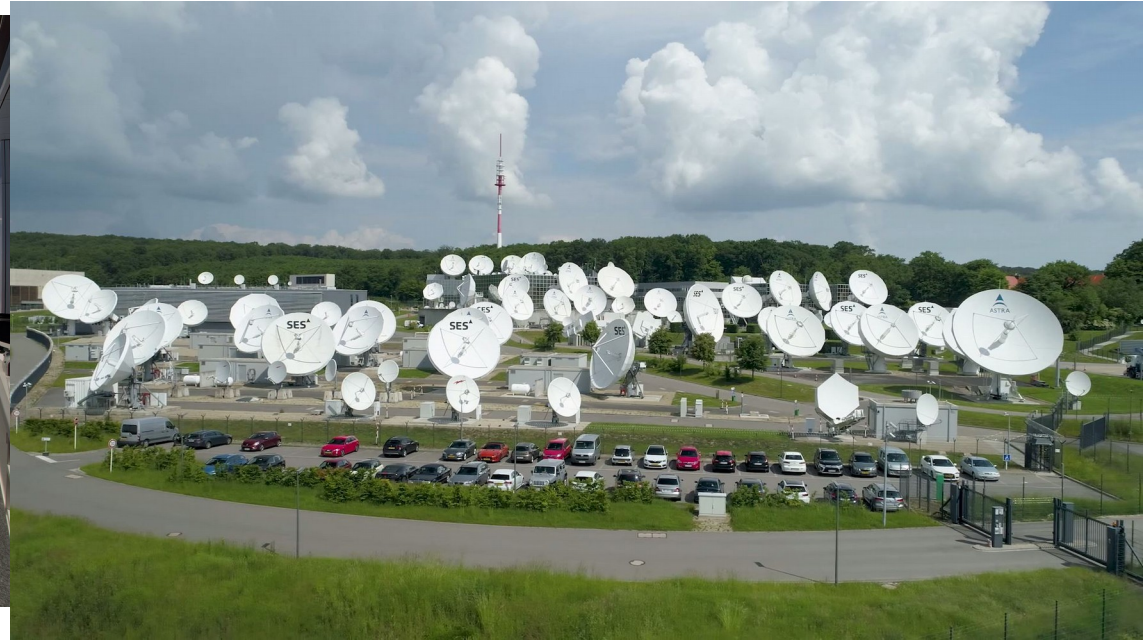


Note: Other impacts possible, depending on frequency used. No impacts if done from plane or balloon.

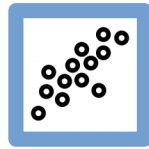
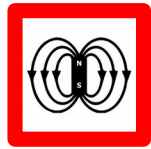
9. Satellite operators



9. Satellite operators

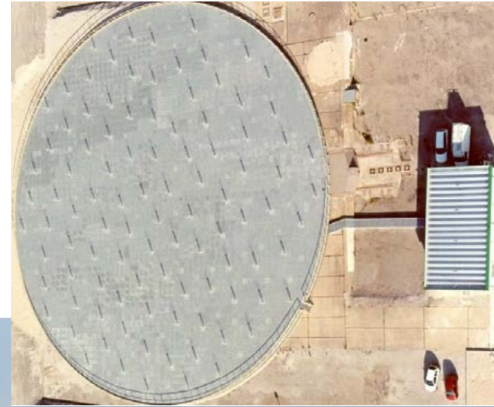
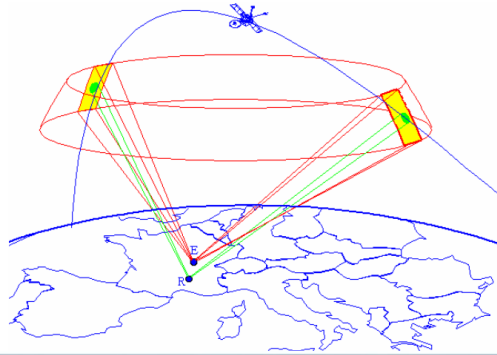


Important:

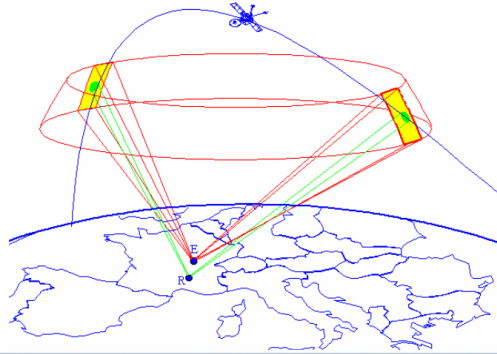


Note: Impacts depends on orbit. The most important impact is on the satellites themselves, rather than the communication with the satellites.

10. Satellite tracking by RADAR



10. Satellite tracking by RADAR



Important:

