



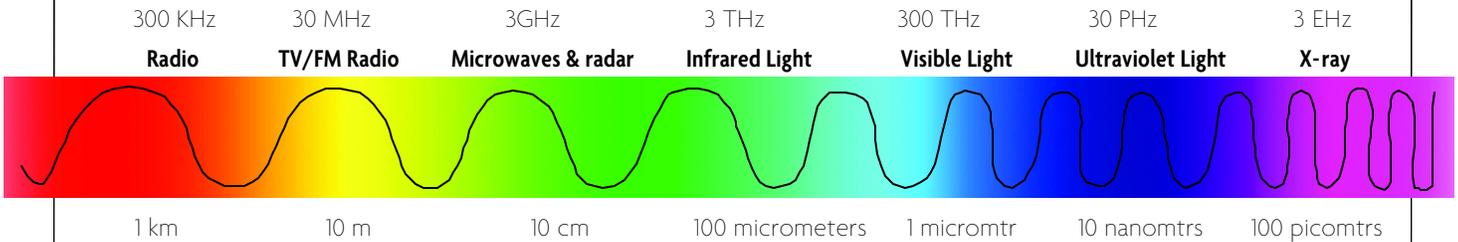
Satellite Comm 101

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When discussing satellite communications and capabilities, it's good to have a baseline of understanding. Here are few critical items to consider:

Understanding the frequency spectrum

Frequencies are measured in hertz: kilo, mega, giga (radio, microwave, radar), tera, peta, exa (light, ultraviolet ray, x-ray). The higher the frequency, the more power required to penetrate rain, snow, etc., while lower frequencies suffer less attenuation.



There are three parts to all communications: the space segment, the control (or antenna/dish) segment, and the ground/user segment. Wavelengths determine the design of the antenna. Normally, the higher the frequency, the higher the bandwidth and data rate support.

Where the 'bands' fit in

Radio frequencies are divided into groups that have similar characteristics called bands, that are then sub-divided into channels. Many different frequencies are used in satellite communications. They are referred to by letters or by the frequency acronym. Different bands work better for different missions. Also, various bands are used so more of the spectrum can be used. The higher the frequency, the bigger the bandwidth. For example, 3 GHz has 400 times more the bandwidth capacity than 30 MHz.



* Referring to bands of satellite comm freqs by using letters started in WWII to keep enemy forces from determining the exact radar frequencies being used. This is why the designations follow no logical sequence.

Small terminals, economical, flexible, highly mobile.

Vulnerable to nuclear event, susceptible to jamming, crowded spectrum, access is difficult.

More bandwidths, flexibility in routing, global connectivity, less vulnerable to nuclear blackout.

Limited frequency allocation, susceptible to jamming, ground terminals are large and expensive.

Extensive bandwidth, uncrowded spectrum, jam resistant, small equipment, least vulnerable to blackout.

Technology immature, risky, susceptible to rain, expensive to outfit.

Satellite types the DoD uses



UHF Follow-on
Mobile units. Space segments are limited, users increasing.

Global Broadcast System
Newer capability. High throughput, small antennas, smart push/pull data broadcasts.

DSCS (Reachback)
User data requirements increasing for data, imagery and split-based operations.

Milstar
Used for battlefield communications. Well protected for the warfighter.

Commercial
Used to augment MILSTAR, high throughput, pay for services.