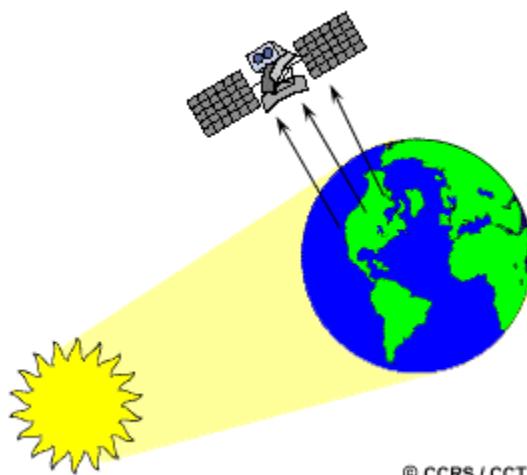


PASSIVE VS. ACTIVE REMOTE SENSING

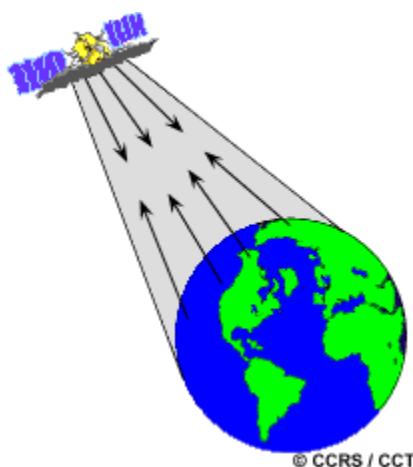
SO FAR, THROUGHOUT THIS CHAPTER, WE HAVE MADE VARIOUS REFERENCES TO THE SUN AS A SOURCE OF ENERGY OR RADIATION. THE SUN PROVIDES A VERY CONVENIENT SOURCE OF ENERGY FOR REMOTE SENSING. THE SUN'S ENERGY IS EITHER **REFLECTED**, AS IT IS FOR VISIBLE WAVELENGTHS, OR ABSORBED AND THEN **RE-EMITTED**, AS IT IS FOR THERMAL INFRARED WAVELENGTHS. REMOTE SENSING SYSTEMS WHICH MEASURE ENERGY THAT IS NATURALLY AVAILABLE ARE CALLED **PASSIVE SENSORS**. PASSIVE SENSORS CAN ONLY BE USED TO DETECT ENERGY WHEN THE NATURALLY OCCURRING ENERGY IS AVAILABLE. FOR ALL REFLECTED ENERGY, THIS CAN ONLY TAKE PLACE DURING THE TIME WHEN THE SUN IS ILLUMINATING THE EARTH. THERE IS NO REFLECTED ENERGY AVAILABLE FROM THE SUN AT NIGHT. ENERGY THAT IS NATURALLY EMITTED (SUCH AS THERMAL INFRARED) CAN BE DETECTED DAY OR NIGHT, AS LONG AS THE AMOUNT OF ENERGY IS LARGE ENOUGH TO BE RECORDED.



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ACTIVE SENSORS, ON THE OTHER HAND, PROVIDE THEIR OWN ENERGY SOURCE FOR ILLUMINATION. THE SENSOR EMITS RADIATION WHICH IS DIRECTED TOWARD THE TARGET TO BE INVESTIGATED. THE RADIATION REFLECTED FROM THAT TARGET IS DETECTED AND MEASURED BY THE SENSOR. ADVANTAGES FOR ACTIVE SENSORS INCLUDE THE ABILITY TO OBTAIN MEASUREMENTS ANYTIME, REGARDLESS OF THE TIME OF DAY OR SEASON. ACTIVE SENSORS CAN BE USED FOR EXAMINING WAVELENGTHS THAT ARE NOT SUFFICIENTLY PROVIDED BY THE SUN, SUCH AS MICROWAVES, OR TO BETTER CONTROL THE WAY A TARGET IS ILLUMINATED. HOWEVER, ACTIVE SYSTEMS REQUIRE THE GENERATION OF A FAIRLY LARGE AMOUNT OF ENERGY TO ADEQUATELY ILLUMINATE TARGETS. SOME EXAMPLES OF ACTIVE SENSORS ARE A LASER FLUOROSENSOR AND A SYNTHETIC APERTURE RADAR (SAR).



[HTTPS://WWW.NRCAN.GC.CA/MAPS-TOOLS-PUBLICATIONS/SATELLITE-IMAGERY-AIR-PHOTOS/REMOTE-SENSING-TUTORIALS/INTRODUCTION/PASSIVE-VS-ACTIVE-SENSING/14639](https://www.nrcan.gc.ca/maps-tools-publications/satellite-imagery-air-photos/remote-sensing-tutorials/introduction/passive-vs-active-sensing/14639)