



Methodology to Observe Satellites in Daytime

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Background: The purpose of this invention is to be able to image artificial satellites during the daytime through the day sky even if the satellite is very close to the Sun and/or near noon when you image the satellite. Old methods of daytime imaging utilize solar illumination only. The best practice is to image as far away from the Sun as possible. This allowed the satellite to be illuminated by the Sun, but is only available near the hours of dawn or dusk and cannot take images in close proximity to the sun. As a result, it would be beneficial to develop an imaging method that solves this long standing issue regarding daytime satellite imaging and improves image quality regarding the overall inspection of satellites.

Technology Description: Researchers at the Air Force Research Lab have developed a method that allows the imaging of satellites during the daytime even in close proximity to the Sun by utilizing Earthshine and key technical elements. The various components of this invention can determine if a satellite is in its expected orbit or if it has moved away. The invention enables accurate angular measures of where a satellite is in the sky during the daytime and enables inspection of the entire ground facing side of a satellite during the daytime. These aspects of the invention help increase resolution, efficiency and improve the calculation of orbital elements of satellites, reducing the time that it takes to compute the orbital elements from over 12 hours to about 20 minutes.

Market Applications:

- Government, military, defense
- Environmental and Energy Applications ie. optimizing solar panel energy output
- Infrastructure
- Astrometrics, Astrodynamics, Space Situational Awareness (SSA)

Key Advantages:

- Allows image to be taken during the daytime and very close to the sun
- Improves image quality and overall inspection of satellites
- Enables accurate angular measurements during daytime
- Increased resolution
- Improved efficiency
- Improved calculation of orbital elements
- Reduces calculation time from 12 hours to 20 minutes

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