

# **Inclined Satellite Orbits and Resulting Ground Station Network Solutions for Near Equatorial Areas**

Martin Krynitz<sup>1</sup>, Kenneth Olafsson<sup>2</sup>

*Kongsberg Satellite Services (KSAT),  
Prestvannveien 38, 9011 Tromsø, Norway*

<sup>1</sup> [martink@ksat.no](mailto:martink@ksat.no)

<sup>2</sup> [kennetho@ksat.no](mailto:kennetho@ksat.no)

**Abstract:** For countries situated along equator it makes sense to build and exploit inclined satellites that only monitor a strip above and below the equator. The inclination is directly proportional to the area monitored. The larger the area being is monitored, the higher is the inclination and the more seldom the satellite comes over same area. In this sense the polar orbit is the orbit that monitors an area with the lowest temporal resolution possible but the only one covering the entire globe. The only area where the polar orbit has the highest possible resolution is near the poles that tend to have limited interest for most applications (except polar research applications).

This paper analyses which inclination is best suited for a remote sensing satellite covering the tropical parts of the world and how ground stations should be located in the most efficient manner to see all orbits and minimize latency.

The STK analysis shows that a location on or very near the equator is not ideal, except for very low inclinations. Instead two ground stations at the same latitude as the satellite inclination north and south of the equator will ensure that all passes are received. In addition an off-set in longitude that is dependent of the satellite inclination is needed. The paper covers the cases for 0-25 degrees inclination and points out the tradeoffs of these orbits with special focus on ground station locations for the different inclinations.

Keywords: (Ground Station, Near Equatorial Orbit, inclination, latency)

Suggested Topics: Ground infrastructure, Satellite Programs, New Generation Sensors and Applications

Paper Title: Inclined Satellite Orbits and Resulting Ground Station Network Solutions for Near Equatorial Areas

Author name: Martin Krynitz, Kenneth Olafsson

Proposed Presenter: Martin Krynitz

Address:

Kongsberg Satellite Services AS

Prestvannveien 38

PO Box 6180 LANGNES

N-9291 Tromsø

Norway

Phone: +47 77 66 13 50

Mobile: +46 703 699 901

Email: [martink@ksat.no](mailto:martink@ksat.no)

Preference: Oral presentation