

ABSTRACT

As the largest island nation in the world, Indonesia is an *archipelagic country*, where 62% of Indonesia's territory is water. This happens because Indonesia is included in the *ring of fire* region which has an impact on the distribution of telecommunications networks in sovereign Indonesia. Satellite technology is one of the solutions as a telecommunications network that is orbited in space and can overcome *blank-spot* areas such as remote islands or mountainous areas that have little economic value and require large investment costs. The government has made efforts through the BAKTI KOMINFO program to integrate telecommunications networks in the HTS satellite sector in GEO orbit but has weaknesses such as high latency values and high propagation attenuation.

Some foreign companies such as Starlink and OneWeb have started to run Broadband access network services through Non-Geostationary Satellite Orbit (NGSO) with low orbit (LEO) which has the advantage of small latency and practical devices and antennas. Threats can occur such as competition for national telecommunications network services that cause domestic users to become dependent on services from foreign parties and. Therefore, the need for an Independent Telecommunication network that can protect the security of user data privacy and the threat of digital attacks from abroad.

From the conclusion of this thesis research using the technical analysis approach, economic analysis, and investment feasibility analysis that Indonesia can implement low orbit (LEO) NGSO satellites in constellation with equatorial inclination and use phased array beamforming antenna technology and use 5 RAAN orbit formations or 8 RAAN orbit formations which have an influence on throughput capacity and investment costs. From the above parameters, it can produce a throughput capacity of 350 Gbps and a coverage area of 175% of Indonesia's territory for a satellite altitude of 600 km and a capacity of 120 Gbps with a coverage area of 263% of Indonesia's territory at a satellite altitude of 900 km. The results of the two types of altitude have advantages and disadvantages that vary on economic analysis in the form of CAPEX-OPEX and investment feasibility analysis.

Therefore, this thesis will explain fundamentally combined with illustrations of orbit simulations that can be a study or reference material for the development of NGSO satellites in equatorial inclination in future developments.

Keywords: LEO satellite, Broadband access network, Feasibility analysis, Orbit, Equatorial.