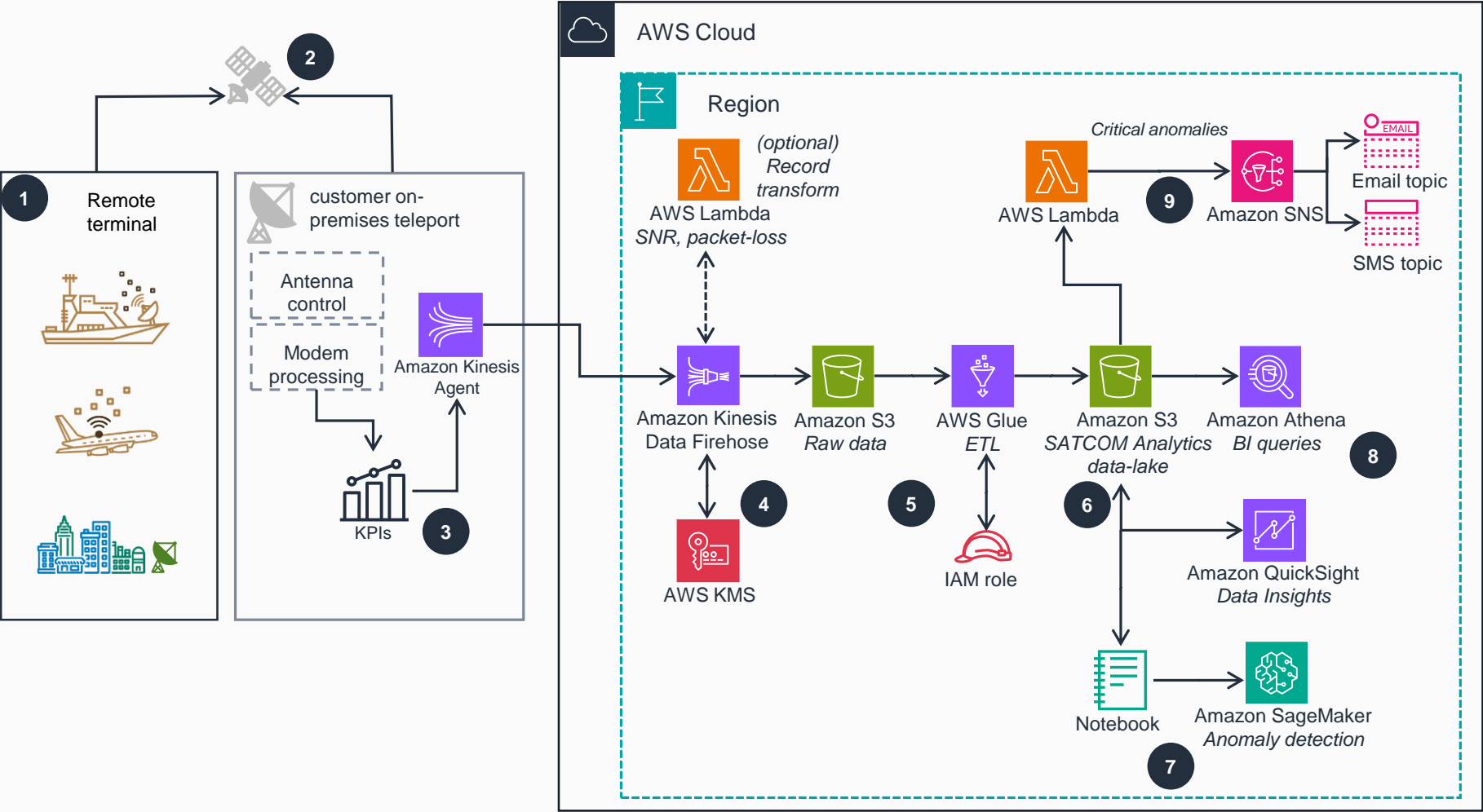# Guidance for Satellite Communications Analytics Pipelines on AWS

This architecture diagram shows how to leverage serverless technologies to extract key performance indicators (KPIs) for satellite communication operators, displaying data-rate trends on a geo-map, and applying machine learning (ML) to flag anomalies.

AWS Reference Architecture

1. Remote terminal with a satellite communications modem and antenna for maritime, aircraft, or urban use cases.

2. Satellite orbiting earth communicating with ground stations using radio frequency links.

3. Satellite teleport with antenna control and Modem processing. **Amazon Kinesis Agent** installed in on-premises compute.

4. Capture streaming metrics such as Signal to Noise Ratio (SNR) in **Amazon Kinesis Data Firehose** with (optional) **AWS Lambda** record transformation. Leverage server-side encryption securely through **AWS Key Management Service (AWS KMS)**.

5. Extract, Transform, Load (ETL) on raw data in **Amazon Simple Storage Service (Amazon S3)** through **AWS Glue** using least privilege **AWS Identity and Access Management (IAM)** role permissions.

6. Cataloged, partitioned, structured data-lake in **Amazon S3**.

7. Anomaly detection and forecasting with machine learning models using Jupyter Notebooks in **Amazon SageMaker.**

8. Business Intelligence (BI) tooling visualizing key insights in **Amazon QuickSight**, and performing SQL queries in **Amazon Athena**.

9. Observability. Send critical anomalies through email or short message service (SMS) topics, using **Lambda** to filter on critical events. Use **Amazon Simple Notification Service (Amazon SNS)** to publish them.