Counter-Strike ESEA Tournament (South Pacific) - Map, Rounds, and Utility-Based Analysis

Introduction

Counter-Strike (CS) is a team-based strategic first-person shooter where the **Terrorist (T) team** aims to plant and detonate a bomb, while the **Counter-Terrorist (CT) team** seeks to prevent the plant or defuse the bomb after it has been placed. The game's outcome is significantly influenced by strategic elements such as map selection, team-side dominance, and most importantly, **utility usage**.

Each map in CS has unique characteristics, making some maps **T-sided** (favoring Terrorists) and others **CT-sided** (favoring Counter-Terrorists). Utility—smoke grenades, flashbangs, molotovs, and HE grenades—plays a crucial role in shaping the dynamics of each round by enabling tactical execution, defending bomb sites, and countering aggressive plays.

This report analyzes the impact of **map selection, round durations, and utility usage** in competitive CS matches from the **ESEA South Pacific tournament**. The dataset used for this analysis contains millions of recorded grenade throws, bomb plants, and match outcomes. The primary goal of this study is to evaluate how **utility influences the course of a round and determines the winning team**.

Dataset Overview

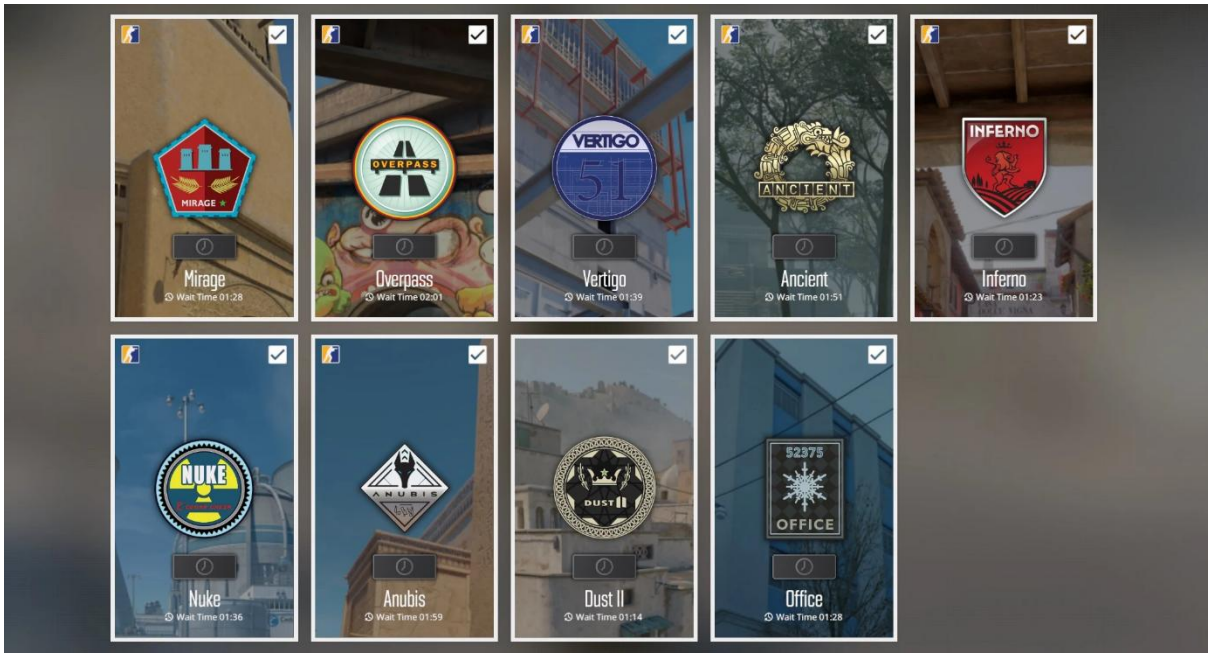
This analysis is based on multiple datasets that record **grenade usage, match metadata, player kills, damage statistics, and map data**. Below is a brief summary of the datasets used:

Primary Datasets

- **esea_master_grenades_demos.part1.csv, esea_master_grenades_demos.part2.csv**
  - Tracks all grenade throws in competitive matches.
  - Key fields: `round`, `seconds`, `nade`, `att_team`, `vic_team`, `att_side`, `nade_land_x`, `nade_land_y`.
- **esea_meta_demos.part1.csv, esea_meta_demos.part2.csv**
  - Stores metadata for each match, including maps, round types, and team equipment values.
  - Key fields: `map`, `round`, `winner_team`, `winner_side`, `round_type`, `ct_eq_val`, `t_eq_val`.
- **esea_master_kills_demos.part1.csv, esea_master_kills_demos.part2.csv**
  - Logs kills made in each round, including the weapon and team details.
  - Key fields: `att_side`, `vic_side`, `wp`, `wp_type`, `is_bomb_planted`.
- **esea_master_dmg_demos.part1.csv, esea_master_dmg_demos.part2.csv**
  - Contains information on damage dealt in each match.
  - Key fields: `hp_dmg`, `arm_dmg`, `hitbox`, `nade`, `winner_team`, `winner_side`.
- **map_data.csv**
  - Contains spatial data for mapping grenade landings.
  - Key fields: `StartX`, `StartY`, `EndX`, `EndY`, `ResX`, `ResY`.

Key Findings

Map Selection and Round Duration



- **Mirage** and **Cache** are the most played maps, with Mirage being the most balanced in terms of T vs. CT win rates.
- **Nuke** is the least played map, likely due to its heavy **CT-sided nature**.
- Matches typically last **20-30 rounds**, with some extending into overtime (35+ rounds).
- Most rounds last **80-90 seconds**, regardless of the map, though pistol rounds tend to be shorter due to aggressive early fights.

Utility Usage Analysis on Mirage

Terrorist Side (T-Side) Utility Usage

On the **T-side**, grenades are used to gain map control, block defender vision, and assist in site executions. Key observations:

- **Smokes**:
  - Most commonly thrown in **Mid** to gain control.
  - **Connector smoke (19 times)** delays CT rotations, enabling an easier push to B-Site.
  - **Window and Short smokes** prevent AWPers from holding Mid aggressively.
  - **Jungle and Stairs smokes** are crucial during A executes, blocking CT sightlines.
- **HE Grenades**:
  - Frequently used to **clear corners and weaken CTs** before executing a site take.
  - Common placements: **Triple Box (A-Site), Bench (B-Site), Van (B-Site), and Mid Boost (Underpass).**
- **Molotovs**:
  - Used to force CTs out of strongholds and deal chip damage.
  - Key placements: **Van (B-Site), Under Balcony (A-Site), Catwalk (Short), and Default Plant (A-Site).**
- **Flashbangs**:
  - Essential for site entries, often thrown before peeking angles.
  - **Jungle and CT spawn flashes** help in A-Site execution.
  - **Market and Short flashes** assist in B-Site entries.
  - **Mid flashes** blind Window and Connector players to facilitate map control.

Counter-Terrorist Side (CT-Side) Utility Usage

On the **CT-side**, grenades serve defensive and retake functions.

- **Smokes**:
  - **Window smoke** helps maintain Mid control.
  - **A-Ramp and Palace smokes** delay A executes.
  - **B-Apps smoke** prevents a fast B rush.
- **Molotovs**:
  - **A-Ramp and Palace molotovs** stop early T aggression.
  - **Mid Window molotov** disrupts T-side control.
  - **B-Apps molotov** delays a rush, forcing Ts to use flashes or take damage.
- **HE Grenades**:
  - **Top Mid HE grenades** deal early damage to T-side players contesting Mid.
  - **A-Main and B-Apps grenades** disrupt Ts before executing a site take.
- **Flashbangs**:
  - **Mid Window flash** allows for aggressive peeks.
  - **Pop flashes for A-Ramp and Palace** support teammates holding site.
  - **Market retake flash** helps blind Ts defending post-plant.

Retake Utility:

- CTs often use **smokes on the bomb** to force Ts out of post-plant positions and execute a safer defuse.
- **Well-timed flashes** disrupt T-side hold angles during retakes.

Conclusion

This analysis highlights the **critical role of utility in CS:GO matches**, demonstrating how well-placed grenades can dictate the flow of the round. The **most balanced map, Mirage**, sees extensive use of smokes and flashes in Mid, while utility deployment on **heavily CT-sided maps like Nuke** is more defensive, aimed at slowing down aggressive pushes.

Understanding utility usage patterns can help teams optimize their strategies, **improve site takes and retakes**, and ultimately **increase their win probability in competitive matches**. Future analysis can expand by integrating **player movement heatmaps** and **real-time grenade effectiveness metrics** to refine team strategies further.