Analysis of Taxi Time of Commercial Aircrafts at International Airports: Study of Manila International Airport (MNL/RPLL)

国際空港における航空機の遅延実態分析－マニラ国際空港を事例として

東京大学 生産技術研究所 大口研究室（交通制御工学）
*http://www.transport.iis.u-tokyo.ac.jp/*
Osea, Jacqueline, Oguchi, Takashi

Background

• Aviation System Performance Metric (ASPM) defined taxi times as the duration spent by an aircraft between rolling from a gate to when it takes off or from the entrance of taxiways to a gate after it lands. Goldberg and Chesser (2008), estimated that taxi-out delays contribute to 26% of the total delay experienced by a departing flight.

Figure. 1 taxi-out procedure
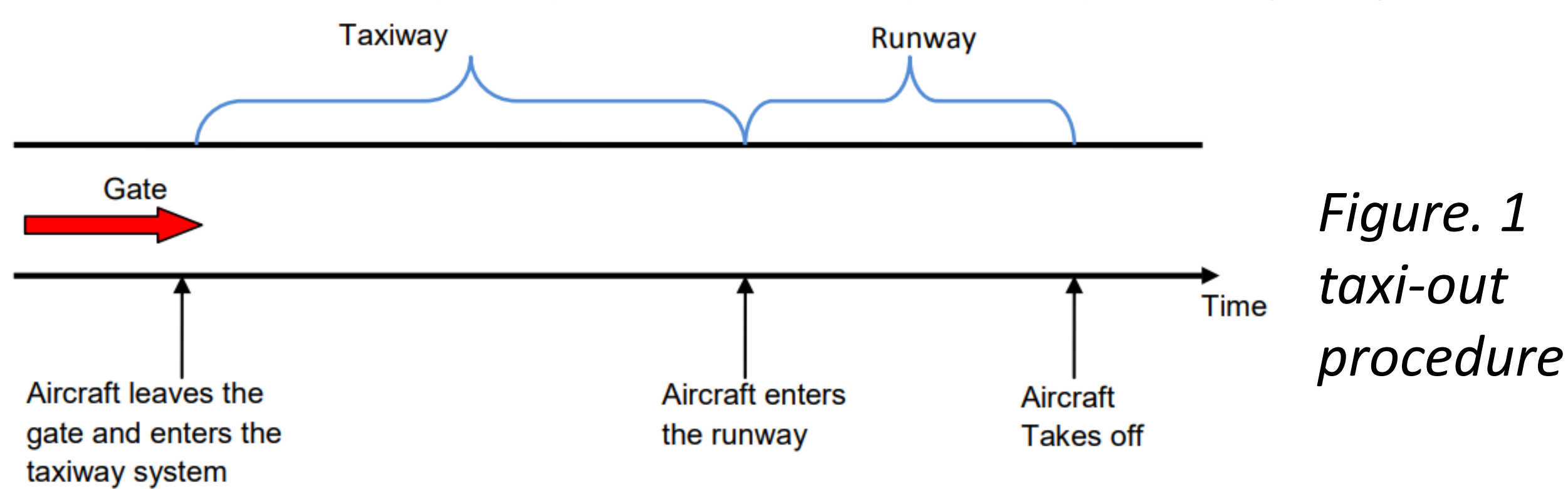
Objectives

1) Airport Congestion
Growing passenger enplanement, put pressure on the airline industry → scheduled flights > airport capacity
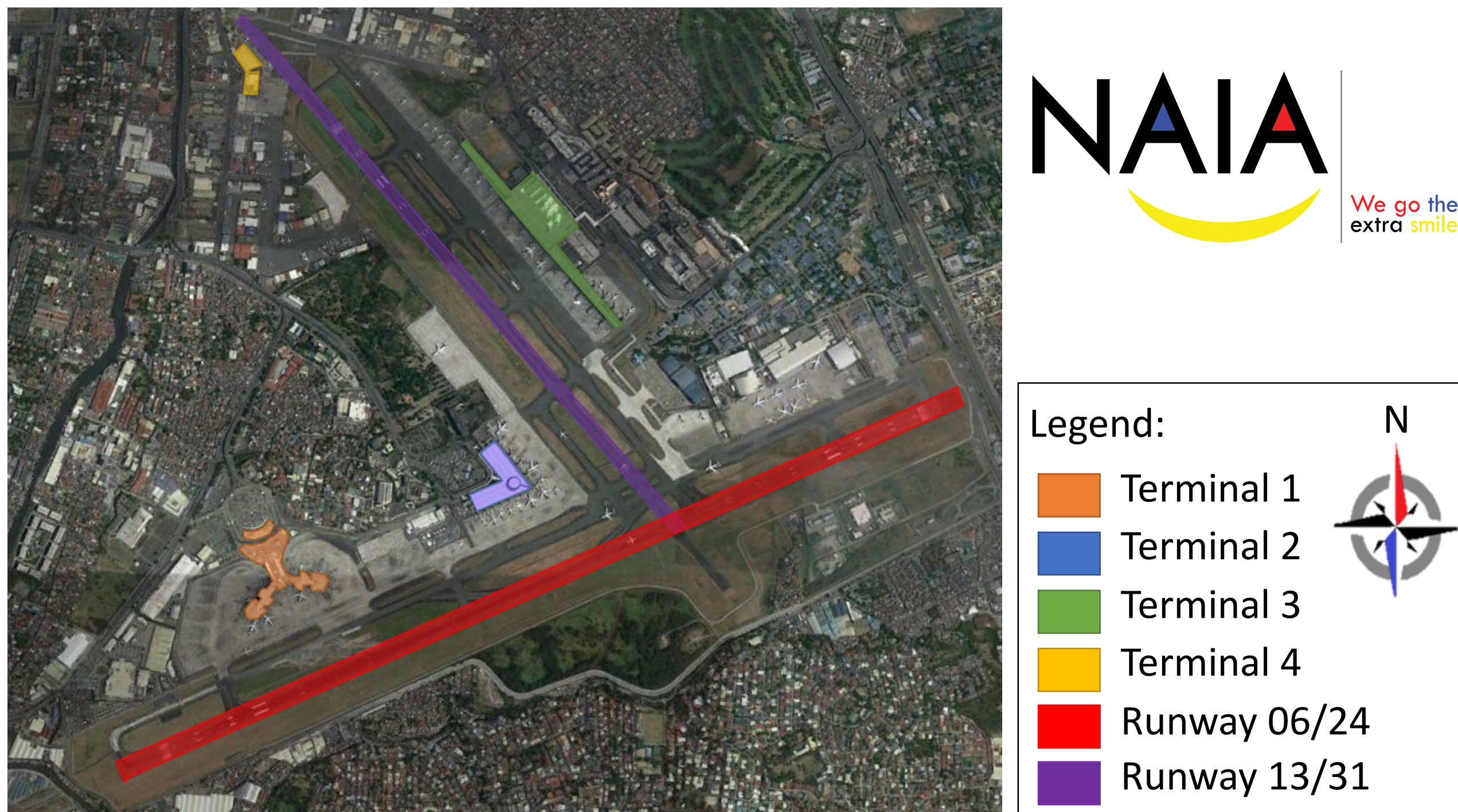
2) Mechanism of Delay
Various casual factors related to aircraft, airline operation → gate, airborne, taxiing, weather

Investigate the taxi time at international airports by empirical analysis of commercial aircrafts data from commercial database
• Determine the mechanism of airside traffic delay
• Assess congestion in terms of taxi time delay

Study Area

• Manila International Airport (MNL/RPLL)

Legend:
- Terminal 1
- Terminal 2
- Terminal 3
- Terminal 4
- Runway 06/24
- Runway 13/31

Figure. 2 Manila International Airport Complex

• Primary airport in Metro Manila and serves as gateway to Philippines
• Consists of 4 passenger terminals and 2 runways
• Handles both international and domestic flights
• In 2018, 45 million enplanement was recorded

Data Overview

• **flightradar24 online database** - Data collection of flight data which include, flight number, origin, destination, published scheduled times, actual time of take-off and landing
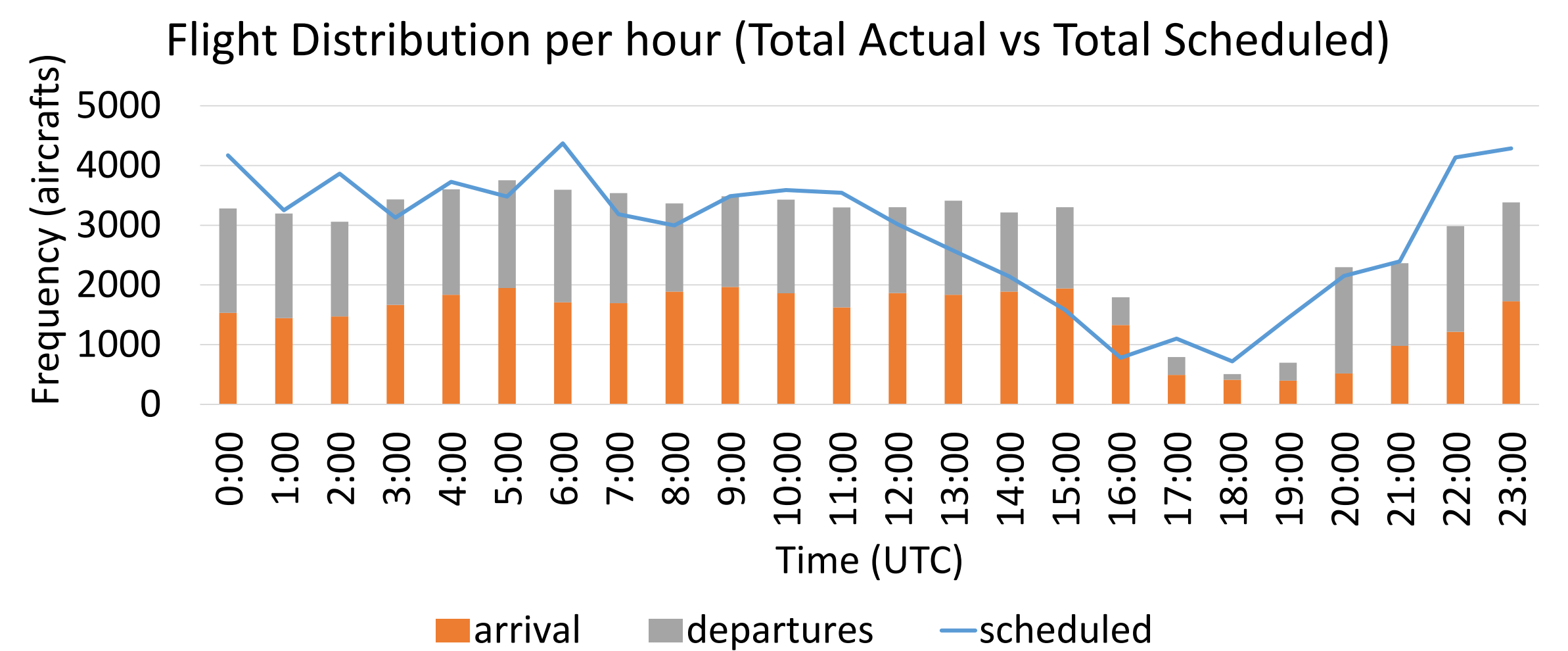
• Inclusive Dates: January 2019 – April 2019

Figure. 3 Flight Distribution per hour – shows that actual flights are spread out throughout the day as opposed to schedule planned

Figure. 4 Representation of (a) arrival delay (b) departure delay performance; arrivals and departures 15 minutes are considered as on-time threshold
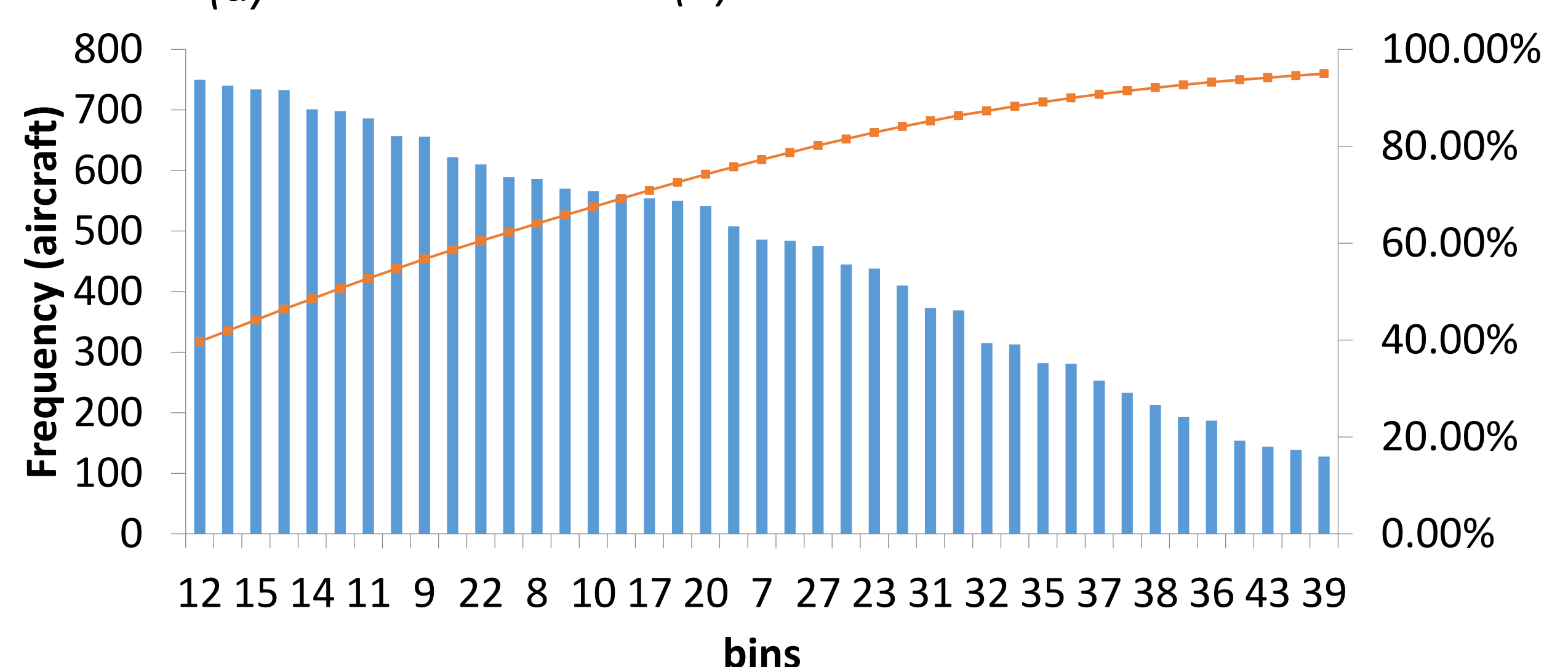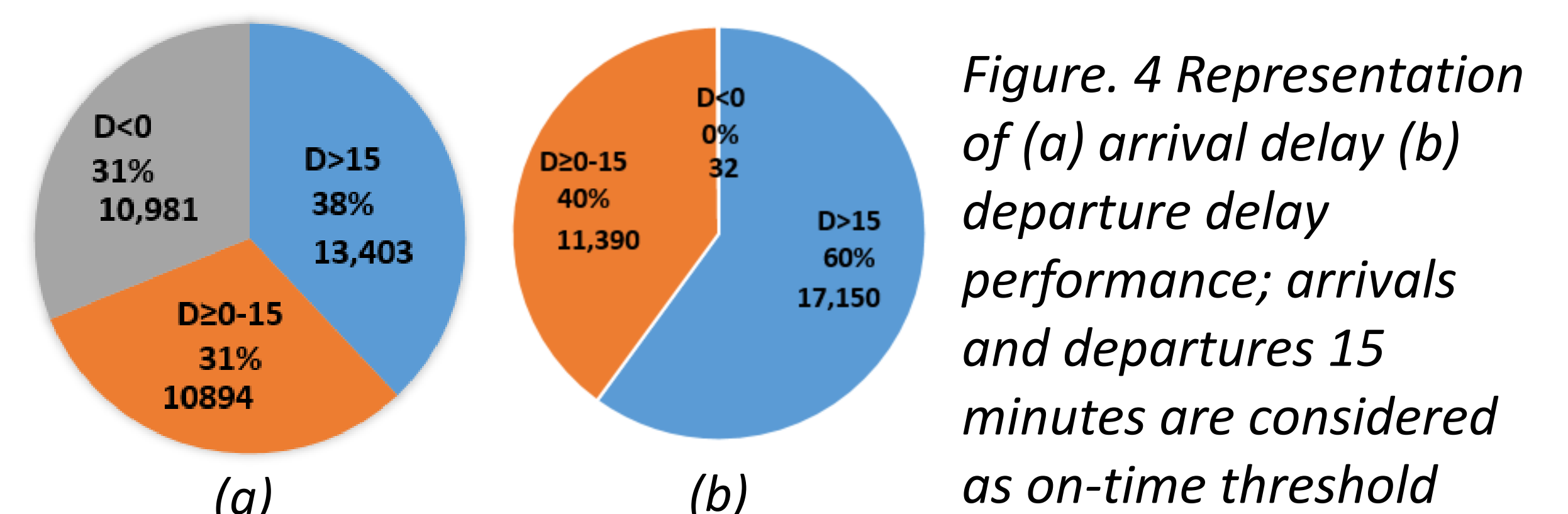

Figure. 5 Histogram – taxi out time from all passenger terminals; weighted mean = 18 mins

Summary

• Analyzing and estimating taxi times of aircrafts at airports are expected to be important in reducing aircraft taxi delay thus reducing landing and takeoff delays.
• Commercial databases present easy access to vast amount of information thus, is able to provide historical and real time data to its users.
• **Future work**: (1) Compare results of other international airports in Philippines; (2) Analyze block times of city pairs.