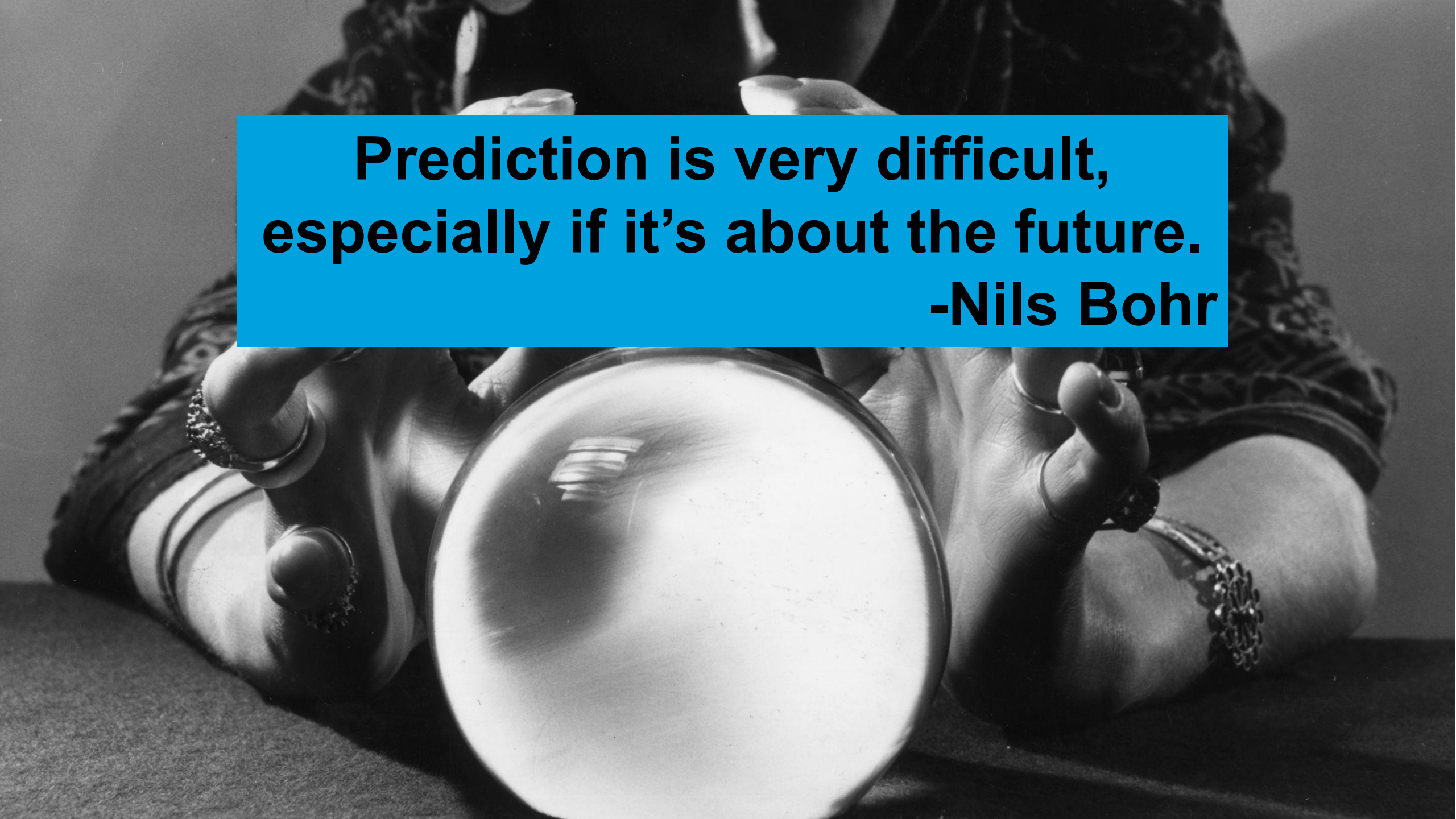
# Introduction to Aviation Forecasting

StART - 02/25/2026


Prediction is very difficult,
especially if it's about the future.
-Nils Bohr

# Airport Planning Process

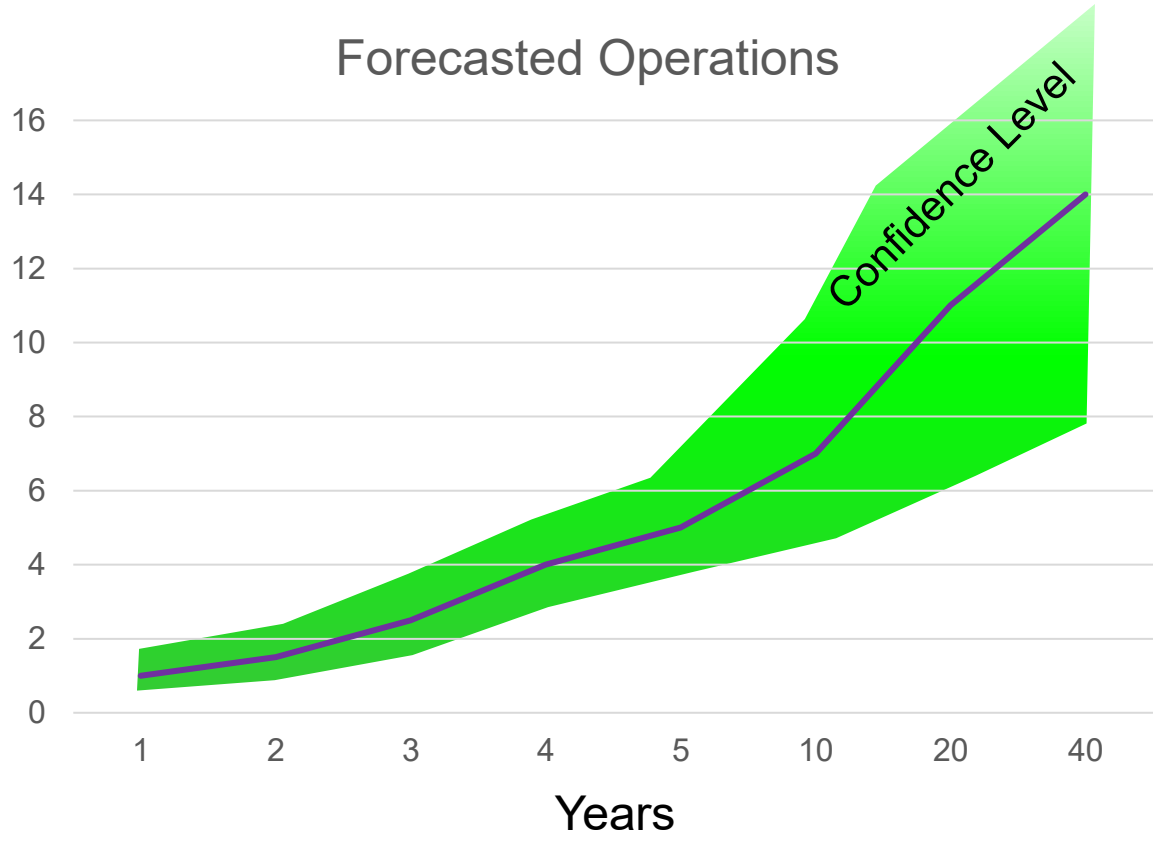
- Identify Passenger Demand for the Airport
  - Forecasting
    - Passengers
    - Aircraft operations
    - Automobiles
- Identify Limitations/Constraints to Meeting Forecasted Demand
  - Physical
  - Operational
  - Level-of-Service (LOS)
- Develop Alternatives to Overcome Constraints
- Evaluate Alternatives
  - Feasibility
  - Costs
  - Other impacts
- Develop Recommendations

# Purpose of Aviation Forecasting

- Long-Term Airport Planning and Capacity Needs
  - Airside Facilities Expansion
  - Landside Facilities Expansion
- Short-Term Operational Planning
  - Personnel Requirements
  - Passenger Travel Time/Delays
- Financial Planning
  - Bond Issues (Financial Feasibility)
  - Annual Budgeting
  - Benefit-Cost Analysis

# Challenges to Aviation Forecasting

- Dynamic Nature of Aviation
  - Airline Bankruptcy/Consolidation
  - Aircraft Manufacturing
  - Cargo/E-Commerce
- Consistent Elements
  - Passenger demand for air travel has proven to be extremely resilient
- Approach to Long Term Forecasts
  - Passenger Activity Levels (PALs) versus Year-Based Predictions
  - PALs Used as Triggers for Action



# Factors Considered for Aviation Forecasting

- Economic Base
- Population Demographics
- Income
- Employment
- Tourism
- GDP/Regional Product

**Unconstrained Forecast**

- Projection of pure demand
- Does not consider airport limitations

# Identifying Constraints/Limitations

- Physical Constraints
  - Example: No Federal Immigration Service = no international flights
- Operational Constraints
  - Example: Runways too close together = less capacity for flights
- Level-of-Service
  - Example: Small gate holdrooms = queuing into the common hallways

# Constrained Operating Growth Scenario

- Simulation/Capacity Modeling Predicts Operational and LOS Constraints
  - Good predictors of trends and points at which action should be taken
  - Models are not useful predictors of total capacity (e.g., >20 min delay)
- Reality of Airport Capacity is Nuanced
  - Three US airports have regulatory caps on aircraft activity (LGA, JFK, DCA)
  - Without regulatory caps, even the most congested airports continue to see growth
    - Below national average
    - Often as a result of small operational changes (flight schedules, size of aircraft, etc.)
- COGS Analysis
  - Used to estimate the small growth once the models stop reliably predicting delay
  - Considers all the small actions an airport and airline may make to increase passenger levels
  - Even with new facilities, constraints can reappear

# Sustainable Airport Master Plan
# Near-Term Projects
# Environmental Review Forecast

Port of Seattle®

# SAMP Demand Forecasts and Constrained Scenarios

| | | 2027 | | 2032 | |
|---|---|---|---|---|---|
| | Type | Aircraft Operations | Passengers (millions) | Aircraft Operations | Passengers (millions) |
| SAMP Demand Forecast (2015) | Unconstrained | 477,000 | 56.0 | 527,000 | 63.0 |
| SAMP Updated Demand Forecast (2019) | Unconstrained | 520,000 | 61.1 | 557,400 | 70.9 |
| No Action (w/o projects) scenario | Constrained | 467,000 | 58.1 | 506,000 | 60.7 |
| Proposed Action (w/projects) scenario | Constrained | 508,000 | 59.2 | 524,000 | 63.1 |

# Environmental review analysis based on constrained growth scenarios