



Airport Master Planning and Terminal Design

Course: Forecasts, Airfield and Terminal Sizing



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Introduction:

Airport master planning and terminal design, covering forecasts, airfield layout and terminal sizing, is a 10-day course for airport planners, airfield engineers, terminal architects and development staff that ends with an Airport Master Plan Outline and Terminal Sizing Report for a case airport. Airports overspend or run short of space when runways, aprons and passenger buildings are sized from unchecked forecasts, without a design-day schedule or agreed level-of-service targets. Nominees already plan, design or review airport facilities and work through modelling builds on forecast, schedule and space data. CoreConcept Training Center delivers this airport master planning and terminal design course.

Course Objectives:

- Structure an airport master plan from facilities inventory and forecasts through alternatives, land use and an implementation plan
- Prepare passenger, aircraft movement and cargo forecasts and convert them into peak-hour figures and a design-day flight schedule
- Plan runway configuration, declared distances, taxiway layout, apron stands and obstacle limitation surfaces against ICAO Annex 14
- Select a terminal concept and size check-in, security, border control, gate and baggage facilities to IATA ADRM level-of-service targets
- Size landside access, curbs, parking, cargo and support facilities and set capacity triggers for phased expansion
- Assemble capital cost, commercial space, sustainability measures and a business case into a master plan outline with terminal sizing

Target Audience:

- Airport planning managers responsible for master plans, land use plans and long-term capacity studies
 - Airfield engineering managers responsible for runway, taxiway and apron design and expansion projects
 - Terminal architecture and design managers responsible for passenger building concepts and space programmes
 - Airport development and capital programme managers responsible for phasing, budgets and investment approvals
 - Commercial and landside planning managers responsible for retail space, ground transport and car parks
 - Consultant team leads responsible for airport feasibility studies and planning reviews for airport owners
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Course Outline:

Day 1: Airport Master Planning Process and Planning Context

- Master Plan Stages from Inventory to Implementation Plan
- Existing Facilities Inventory and Site Constraints Mapping
- Planning Horizons, Objectives and Stakeholder Consultation Map
- Aerodrome Reference Code Selection for the Design Aircraft
- Land Use Plan Zoning for Airside, Landside and Reserves

Day 2: Air Traffic Forecasting and Design-Day Flight Schedules

- Passenger, Aircraft Movement and Cargo Forecast Methods Comparison
- Econometric Regression and Market Share Forecast Models
- Peak Hour Ratios and Typical Peak Hour Passenger Derivation
- Design-Day Flight Schedule Build from the Annual Forecast
- Forecast Scenario Range and High and Low Sensitivity Bands

Day 3: Runway System Planning and Airfield Capacity

- Runway Configuration Options for Single, Parallel and Open-V Layouts
- Wind Coverage Analysis for Runway Orientation Decisions
- Declared Distances TORA, TODA, ASDA and LDA in Planning
- Runway Length Requirement for the Critical Aircraft and Stage Length
- Hourly Runway Capacity Estimate by Fleet Mix and Runway Use

Day 4: Taxiways, Aprons and Obstacle Limitation Surfaces

- ICAO Annex 14 Physical Characteristics for Runway Strips and Taxiways
- Parallel Taxiway, Rapid Exit and Bypass Taxiway Layout Planning
- Apron Stand Count Sizing from Design-Day Gate Demand
- Contact and Remote Stand Mix with Apron Clearance Envelopes
- Obstacle Limitation Surfaces for Approach, Transitional and Conical Protection

Day 5: Guided Case Study on Airfield Development Alternatives

- Case Airport Traffic Records and Site Constraints Brief
 - Long-Term Forecast and Design-Day Schedule Preparation for the Case
 - Runway and Taxiway Layout Alternatives Sketch and Comparison
 - Obstacle Surface Check of Alternatives Against Surrounding Terrain
 - Airfield Development Note with Alternatives Evaluation Matrix
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Day 6: Terminal Concepts and Passenger and Baggage Flow

- Terminal Concept Comparison of Pier, Satellite, Linear and Remote Pier
- Centralised and Decentralised Processing Concept Selection
- Departure, Arrival and Transfer Passenger Flow Diagrams
- Domestic and International Segregation with Swing Gate Planning
- Automated People Mover Planning for Remote Concourses

Day 7: Level-of-Service Sizing and Passenger Processor Planning

- IATA ADRM Level of Service Space and Waiting Time Parameters
- Optimum, Sub-Optimum and Over-Design Sizing Band Interpretation
- Check-In Counter and Self-Service Bag Drop Quantity Calculation
- Security Screening Lane and Border Control Desk Sizing
- Gate Holdroom and Boarding Lounge Seating Area Calculation

Day 8: Baggage Systems, Landside Access and Support Facilities

- Baggage Handling System Throughput and Sortation Concept Planning
- In-Line Hold Baggage Screening and Make-Up Area Sizing
- Landside Access Road and Terminal Curb Length Sizing
- Car Park Demand and Ground Transport Interchange Planning
- Cargo Terminal, Fuel Farm and Support Facility Land Allocation

Day 9: Phasing, Commercial Space, Sustainability and Business Case

- Capacity Trigger Points and Phased Expansion Sequencing
- Non-Aeronautical Revenue Space and Retail Area Planning
- Airport Sustainability and Climate Resilience Design Measures
- Capital Cost Estimate and Life-Cycle Cost Build-Up
- Airport Development Business Case with Demand and Revenue Tests

Day 10: Modelling Build Capstone on a Case Airport Master Plan

- Case Airport Brief with Forecast, Site and Fleet Data
 - Design-Day Peak Demand Applied to Terminal Processor Counts
 - Terminal Area Schedule by Level of Service Band
 - Phasing Plan and Cost Envelope for the Case Airport
 - Master Plan Outline and Terminal Sizing Report Completion
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Skills You Will Gain:

- Air Traffic Demand Forecasting
- Design-Day Schedule Development
- Runway System Configuration
- Obstacle Surface Assessment
- Terminal Concept Selection
- Passenger Processor Sizing
- Landside Access Planning
- Airport Capital Phasing

Why Attend This Course:

- Deliver an Airport Master Plan Outline and Terminal Sizing Report to the planning director and the capital programme board
- Decide which runway layout, terminal concept and processor quantities a forecast actually justifies at each planning horizon
- Avoid terminals built too small for the design day, stranded apron investment and expansions triggered years too late
- Share forecast templates, level-of-service sizing sheets and phasing triggers with planning, design and commercial colleagues

Conclusion:

Back at work, the participant presents the Airport Master Plan Outline and Terminal Sizing Report to the planning director, the capital programme board and airline partners. The board uses it to agree the preferred runway and terminal concept, the space programme each phase must deliver and the capacity triggers that release the next investment. After the first annual traffic review, the planning unit should compare actual peak-hour passengers, aircraft movements and processor queues with the forecast and sizing assumptions, then adjust triggers and phasing where results diverge.

Frequently Asked Questions FAQ:

What should participants know before an airport master planning and terminal design course?

Participants should already work on airport planning, design or development projects and be comfortable with spreadsheets. Bringing anonymised traffic records, a site plan or an existing terminal layout lets them test forecasting and sizing methods on their own airport.

How does airport master planning and terminal design differ from an airport operations course?

It decides what to build and when: forecasts, runway and apron layout, terminal concepts, space sizing, phasing and cost. Airport operations courses manage the facilities already built, covering stand allocation, turnaround coordination and daily performance.

Why does airport terminal design use a design-day schedule rather than annual passenger numbers?

Terminals must handle the busiest hours, not the yearly average. A design-day schedule turns the annual forecast into hourly flows of departing, arriving and transfer passengers, which drive processor counts, queue space and gate lounge areas.

What do participants take back from the airport master planning and terminal design course?

Participants take back an Airport Master Plan Outline and Terminal Sizing Report for a case airport, with forecast and design-day templates, an airfield alternatives matrix, level-of-service sizing sheets and a phasing and cost plan they can adapt.
