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# Airplane Performance Analysis Domain

OMG Transportation Task Force

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# Airplane Performance Analysis Domain Presentation Contents

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## Outline of Presentation:

1. Principal Users
2. Principal Use Cases
3. Configure Airport Use Case
4. Configure Airplane Use Case
5. Configure Track Use Case
6. Configure Profile Use Case
7. Configure Environment Use Case
8. Configure Study Use Case
9. Application Design Goals & Systems Architecture
10. Middleware Design Goals

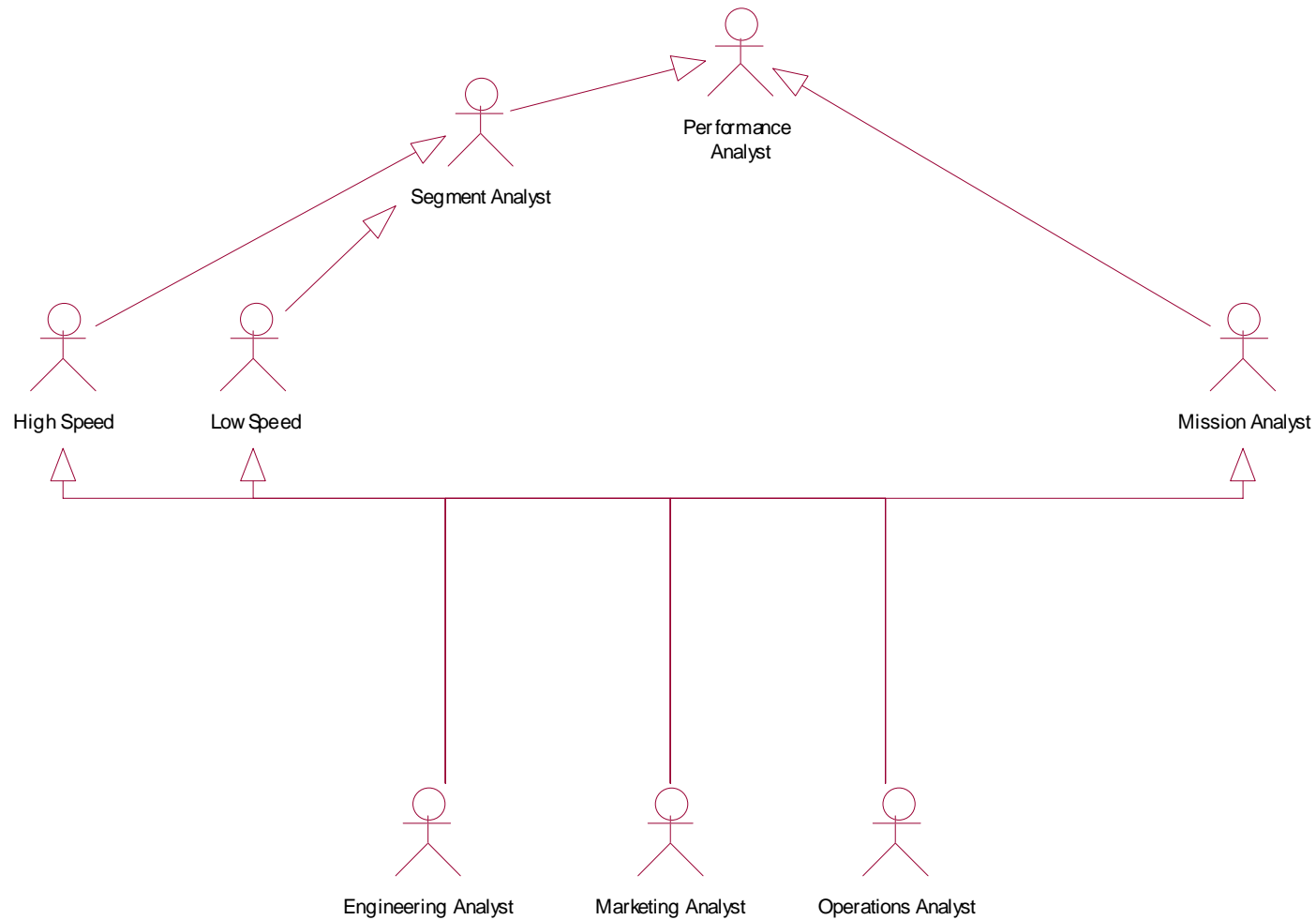


# Airplane Performance Analysis Domain Principal System Users

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# Airplane Performance Analysis Domain

## Principal System Users

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- A *performance analyst* is responsible for determining the in-flight performance of a given airplane under given conditions.
- A *segment analyst* is responsible for establishing performance of one or more flight segments such as take off or climb.
- A *mission analyst* is responsible for establishing performance of the airplane from gate-to-gate, i.e. from the engine start upon departure to the engine shut down upon arrival.
- The *high speed segment analyst* is responsible for establishing the aircraft performance mission segments that are typically at or above the 1500 ft. altitude after takeoff to the same altitude before landing.
- A *low speed segment analyst* is responsible for establishing the performance of a given airplane under the low speed conditions, usually during takeoff and landing.
- The *engineering analyst* evaluates a given airplane design under a variety of specific performance design requirements.
- The *marketing analyst* estimates a given airplane's performance under a given airline's specified airplane study rules and compares these results to competitors.
- The *operations analyst* computes performance parameters necessary to operate a given airplane under a specific flight plan.

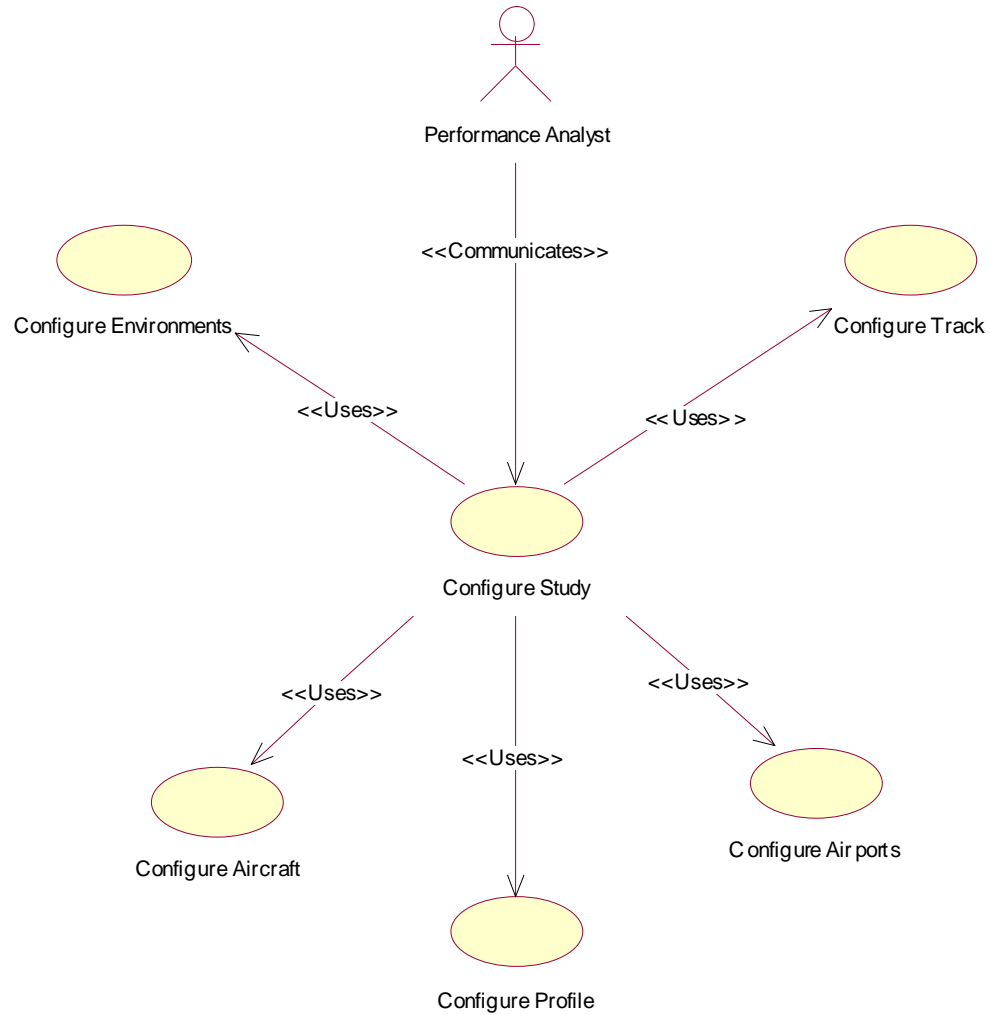


# Airplane Performance Analysis Domain Principal Use Cases

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# Airplane Performance Analysis Domain Principal Use Cases

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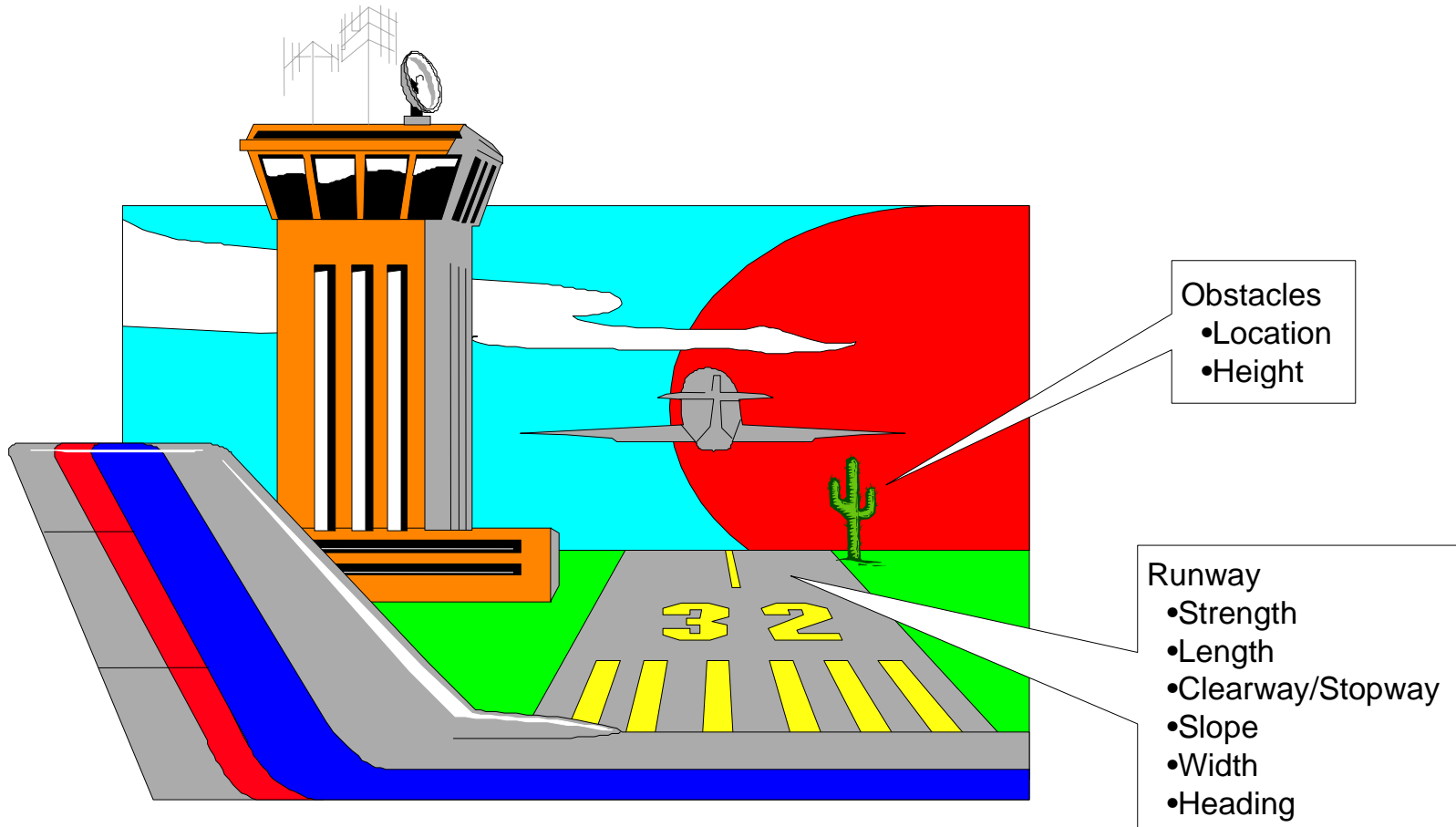
- In the *configure airport* use case the analyst may either create an airport model from scratch or select from an existing database of real airports.
- In the *configure airplane* use case the analyst specifies all operational aircraft configuration attributes that are required for the performance computation
- In the *configure track* use case the analyst either establishes a track by which the aircraft will travel from origin airport to destination airport or establishes an origin and requests that either payload or range be computed.
- In the *configure profile* use case the analyst assembles a sequence of standard flight segments (i.e. climb or cruise) from a given list.
- In the *configure environment* use case the analyst defines atmospheric conditions both at the airport surfaces and aloft.
- In the *configure study* use case the analyst may constrain any combination of configuration elements from the other use cases. The analyst may also specify overall analysis properties such as case study iteration parameters.

# Airplane Performance Analysis Domain Configure Airport Use Case

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# Airplane Performance Analysis Domain

## Configure Airplane Use Case

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|  |   |                      |
|--|---|----------------------|
| Passenger capacity   |   |                      |
|  | Inclusive tour                            | 255                  |
|  | Two-class                                 | 224                  |
|  | Three-class                               | 181                  |
| Design range, mi (km)                                      |   | 7,655<br>(12,315)    |
| Maximum gross weight, lb (kg)                              |   |                      |
|  | Takeoff                                   | 395,000<br>(179,170) |
| Typical operating empty weight, lb (kg)                    |   | 186,900<br>(84,775)  |
| Engines  |   |                      |
|  | Pratt & Whitney                           | PW4000               |
|  | General Electric                          | CF6-80C2             |
| Maximum fuel capacity, U.S. gal (L)                        |   | 24,140<br>(91,370)   |
| Lower-hold cargo volume, ft <sup>3</sup> (m <sup>3</sup> ) |   |                      |
|  | Containers + bulk                         | 3,070<br>(86.9)      |
|  | 96- by 125-in pallets + containers + bulk | 2,875<br>(81.4)      |



With a three-class intercontinental interior, the 767-200/-200ER can carry 181 passengers up to 7,655 miles (12,315 km)

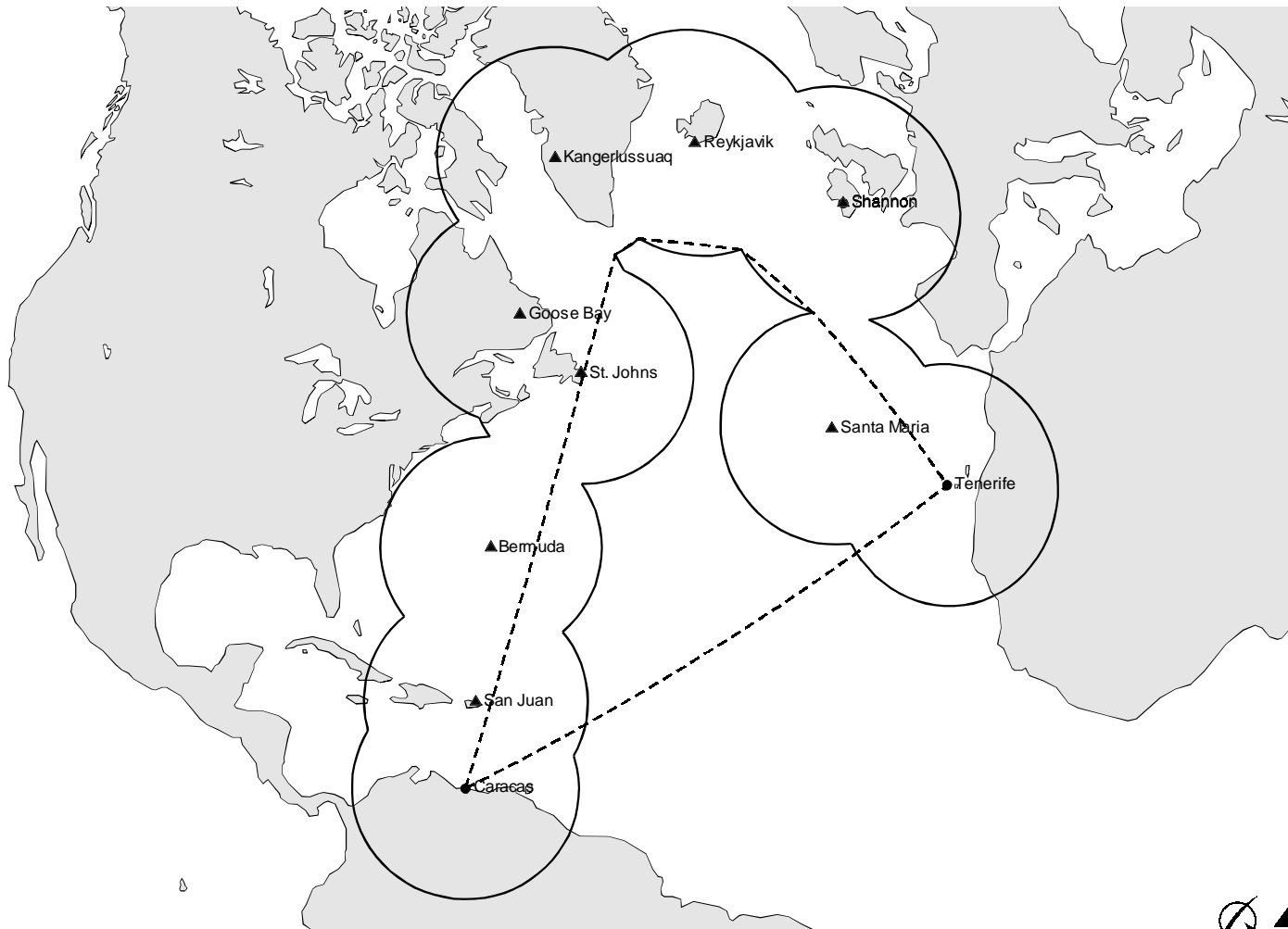
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# Airplane Performance Analysis Domain Configure Track Use Case (ETOPS Constraints)

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# Airplane Performance Analysis Domain Configure Track Use Case (Range Capability)

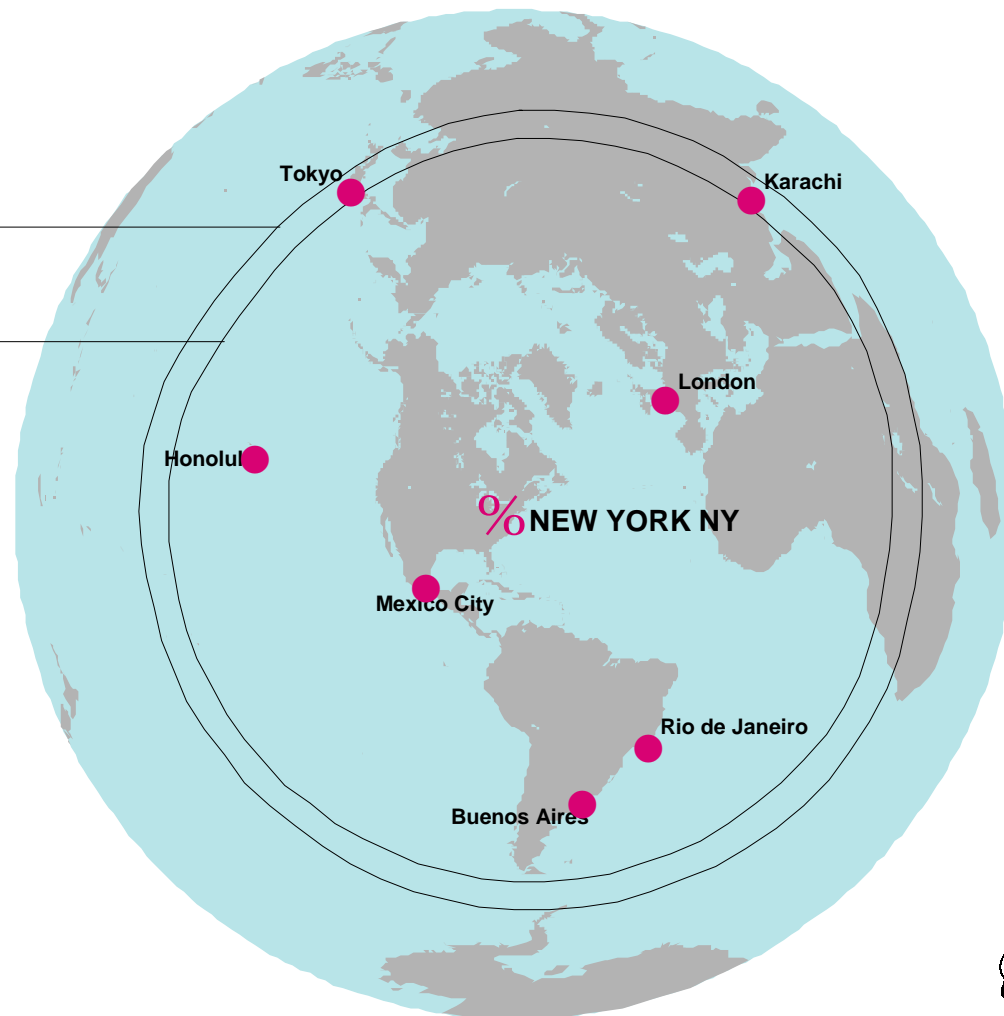
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**767-200ER**  
395,000 lb MTOW  
(179,172 kg)

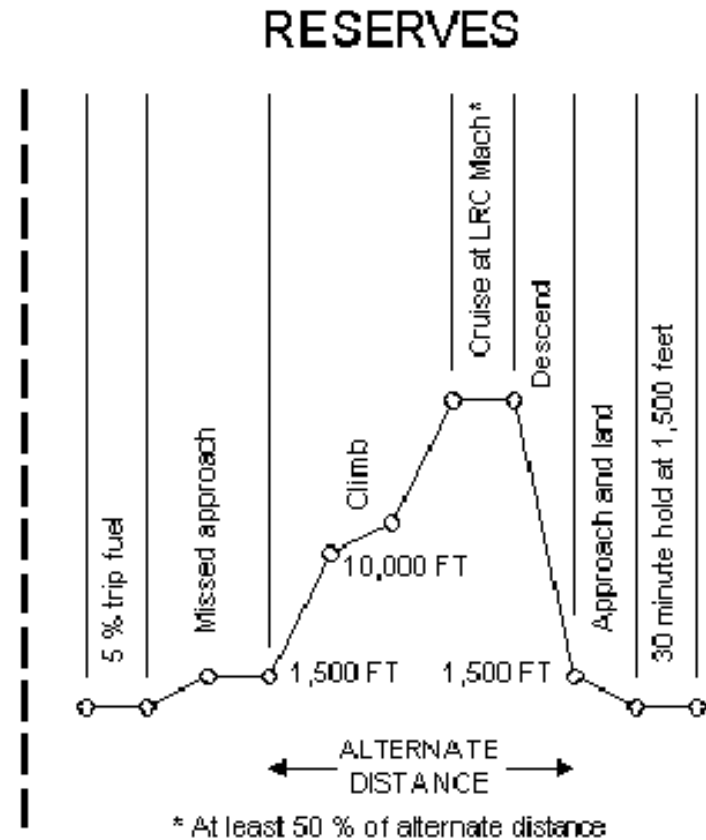
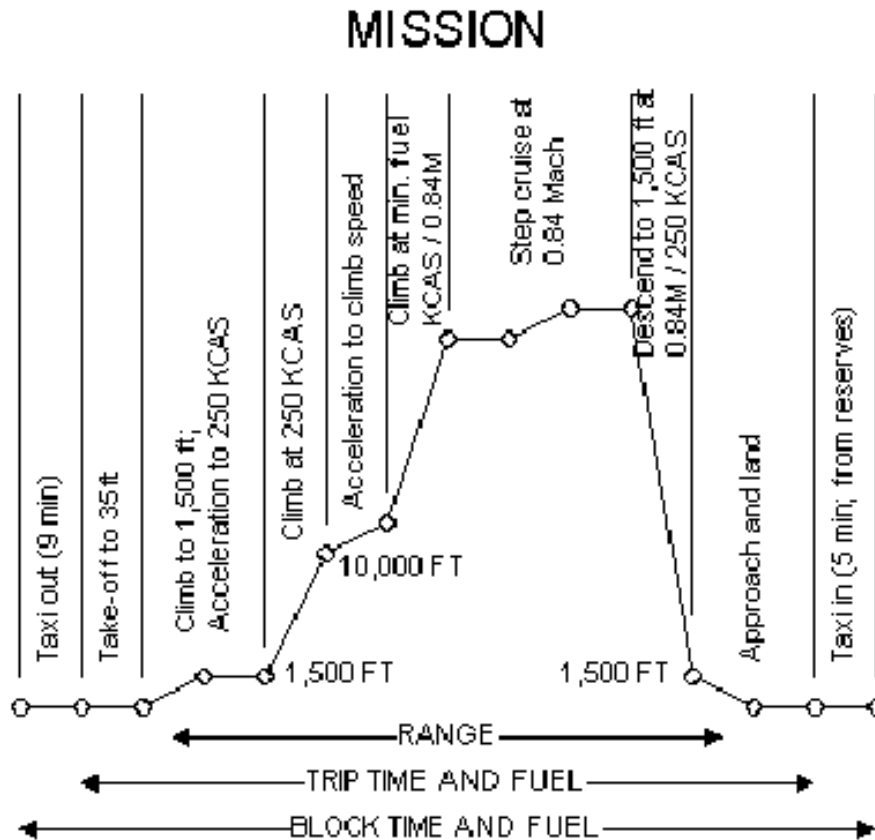
**767-300ER**  
412,000 lb MTOW  
(186,883 kg)



# Airplane Performance Analysis Domain Configure Profile Use Case ( Mission )

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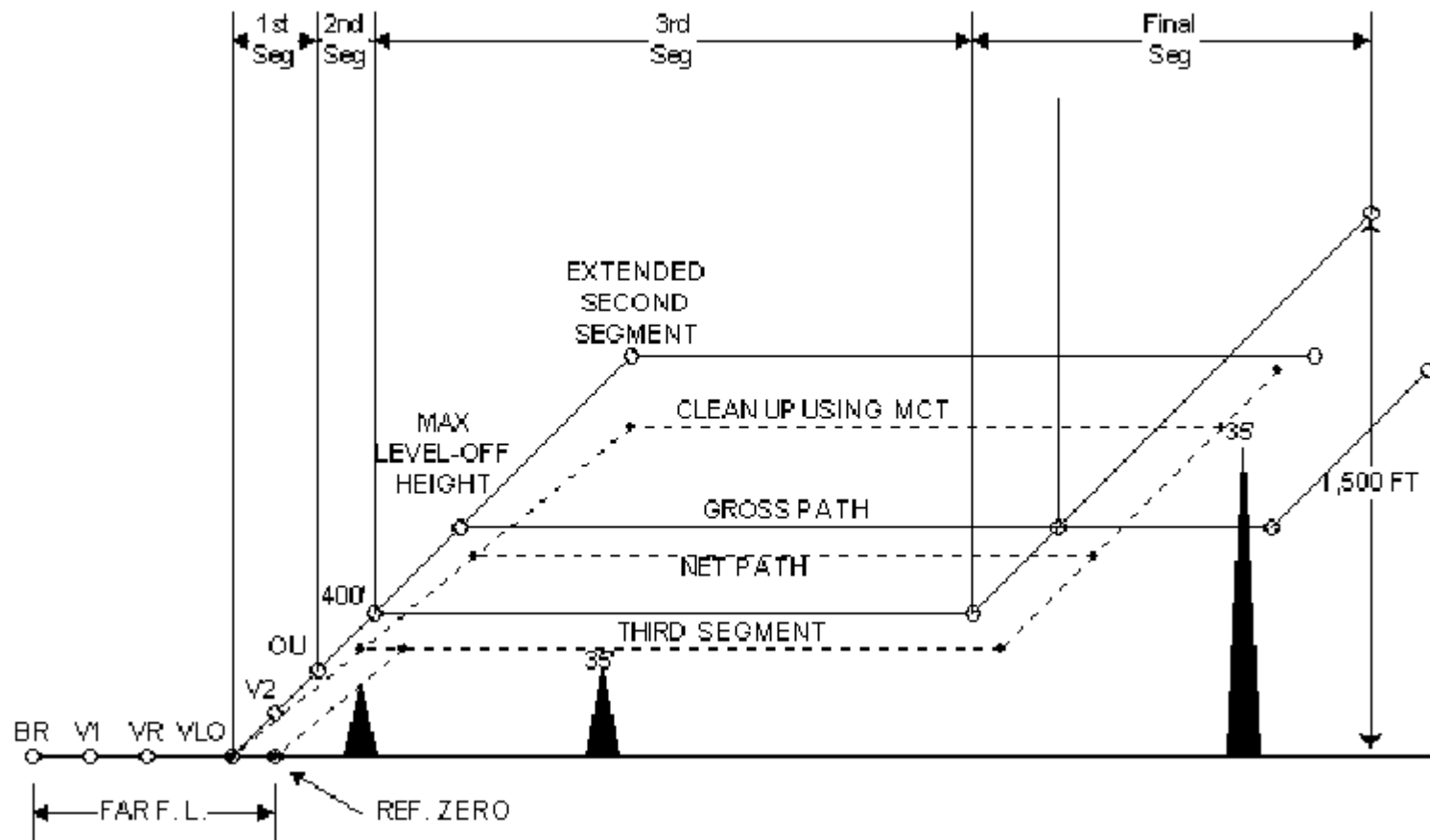
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# Airplane Performance Analysis Domain Configure Profile Use Case (Take Off)

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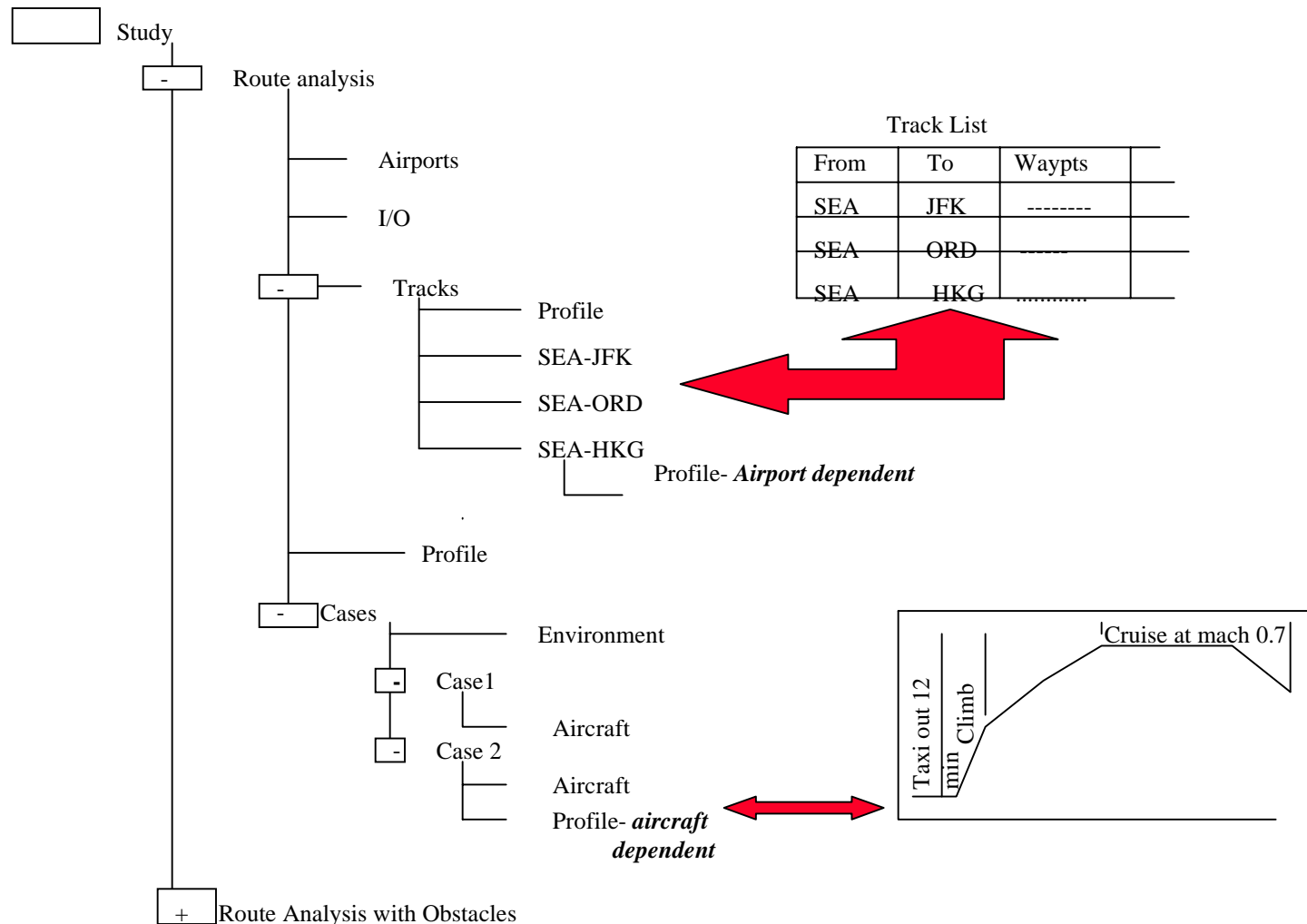




# Airplane Performance Analysis Domain Configure Study Use Case

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# Airplane Performance Analysis Domain Application Design Goals

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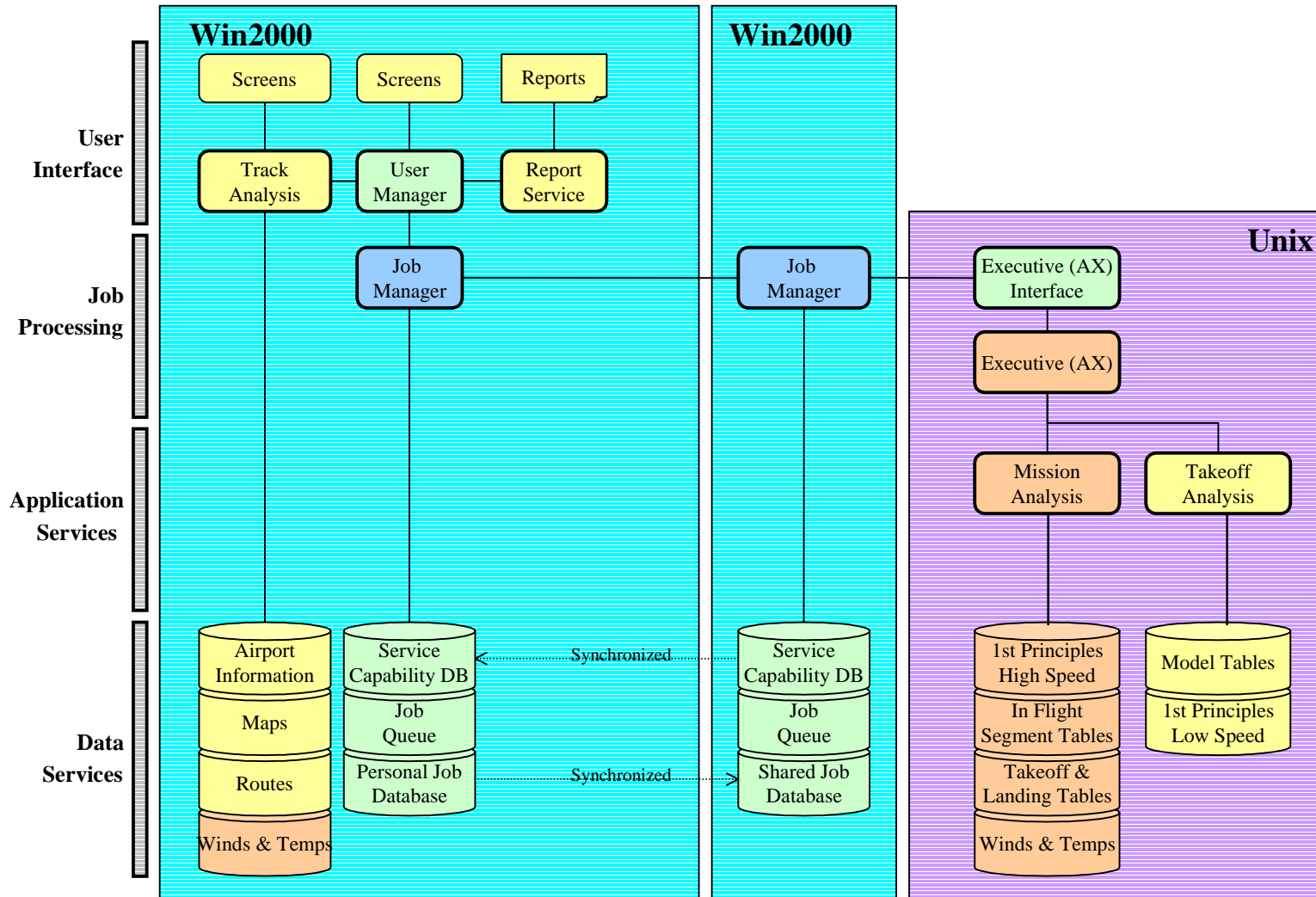
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- Integrate existing mission analysis capability with robust airport information, map presentation capability, track analysis functionality, and takeoff functionality.
- Enable use of the system anywhere in the world at any time.

# Airplane Performance Analysis Domain Systems Architecture - Networked Configuration

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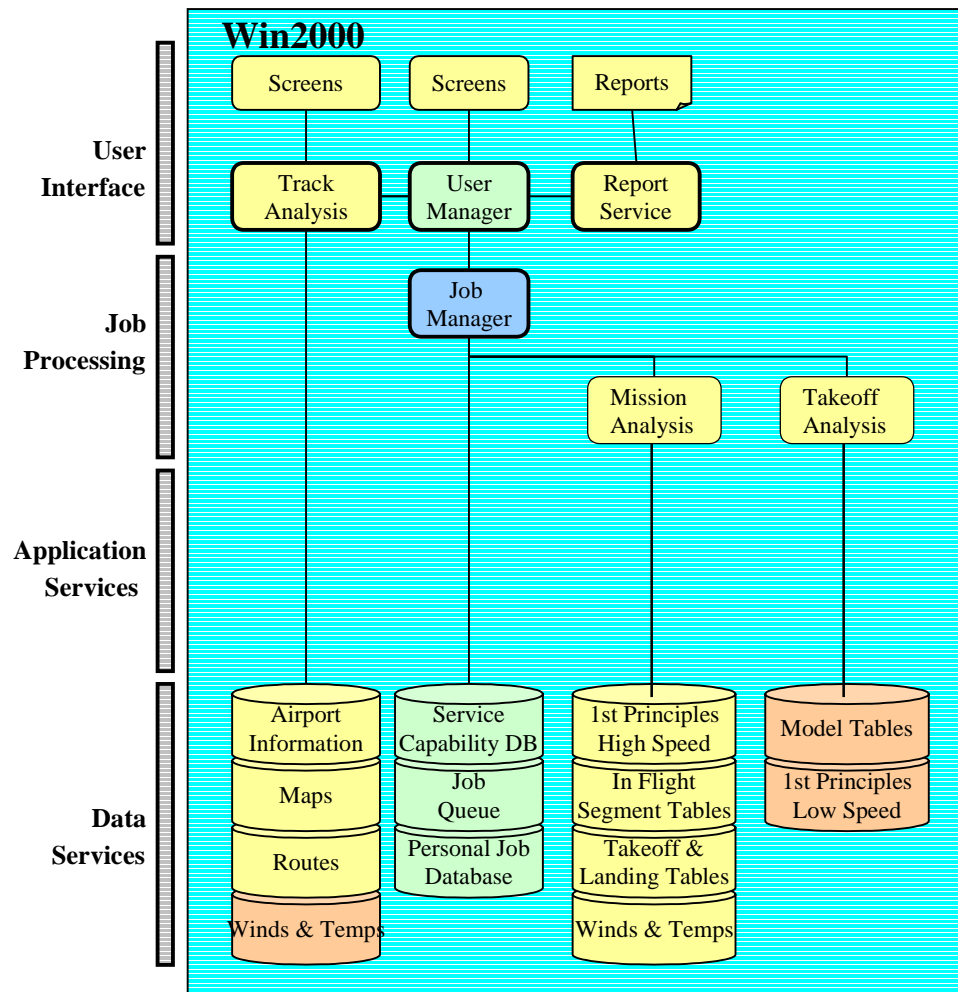
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# Airplane Performance Analysis Domain Systems Architecture - Standalone Configuration

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# Airplane Performance Analysis Domain Middleware Design Goals

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- 1. Support for off-line (asynchronous), distributed processing of complex multi-service requests**
- 2. Scalability in:** Request size, Number of requests, Number of requesters (users), Number of integrated application services
- 3. Fault Tolerance in:** Network failure, client application failure or in off-line mode, application service failure or in off-line mode, revisions of application service interfaces, application service load balancing
- 4. Reusability of:** Object implementations within all installation configurations, object interfaces for local and remote services, interaction (job) syntax (XML) and grammar (XML DTD), stored job templates between user groups, objects as business objects enable “Thin GUI” design which can ease transition to other GUI approaches (i.e. Web Interfaces etc.)