

- **Context**
- **Baseline**
- **Concept**
- **Applicability**
- **Capabilities**
- **Why TBO**
- **Procedures**
- **Checklist**
- **Dependencies**



Context



- **Traffic Synchronisation**
- **CM and DCB integrated**
- **Organized flow of traffic**
- **Flexible capacity management**
- **Adjustments in capacity to variations in demand**
- **Delegation of separation to flight deck reducing ground system workload**
- **Information rich environment.**

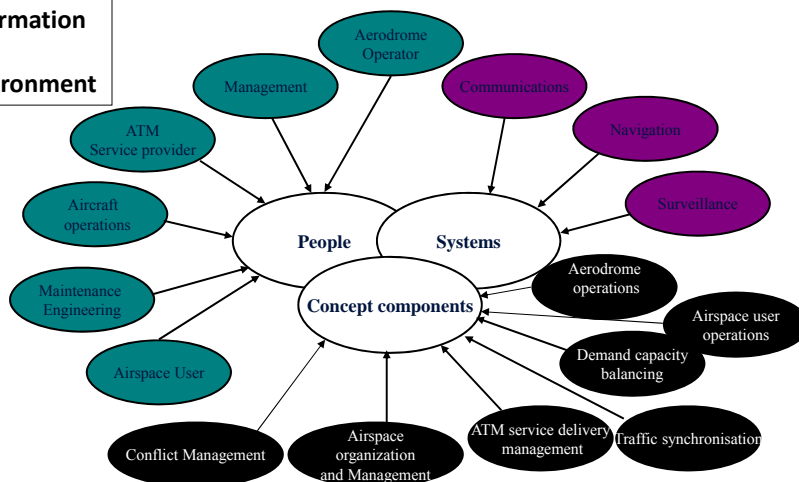
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Baseline



**Information
rich
environment**



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Baseline



- Shared four-dimensional trajectory
- Up-to-date information system wide
- Decision support tools
- Global ATM decision-making
- Procedures and automation capabilities, both ground-based and aircraft-based
- Accurate trajectories to benefit the system.

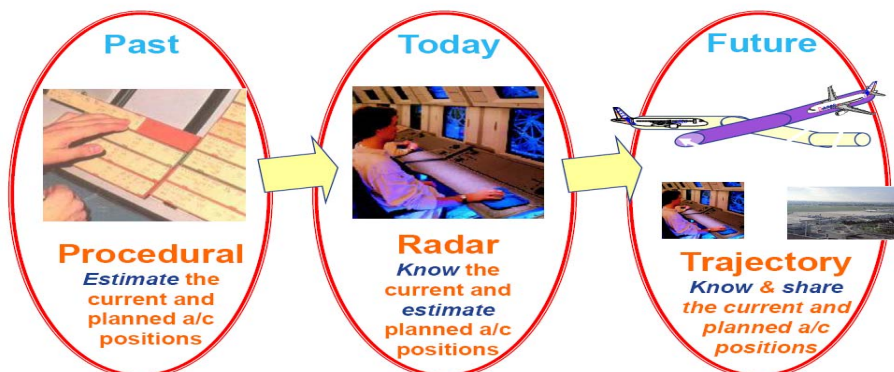
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Concept



The Paradigm Shift



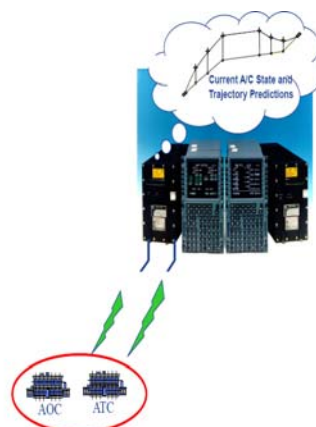
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Concept



- 4 dimensional continuum flight path based on points in time from gate-to-gate
- Ability of cockpit automation to fly the aircraft more precisely and predictably reduces routine tasks of controllers.



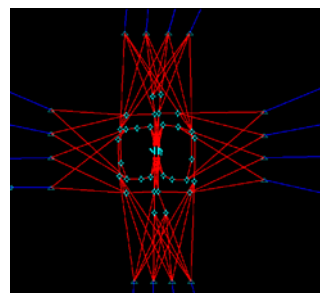
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Applicability



- Air traffic flow planning
- En-route operations
- Terminal operations (arrival/departure)
 - aircraft equipage is assumed in the areas of:
 - ADS-B/CDTI
 - data communication and advanced navigation capabilities.



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Capabilities



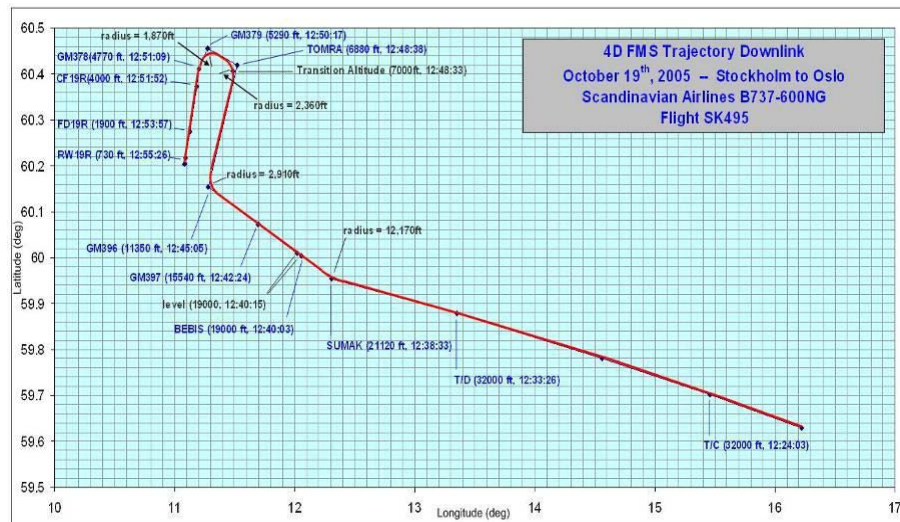
- Advance Aircraft Capabilities
- Problem Detection and Resolution
- Traffic Flow Management and Time-Based Metering



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Capabilities



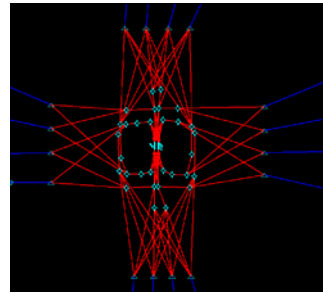
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Why TBO



- **Greater capacity**
- **Better efficiency**
- **Improved safety**
- **Reduced fuel burn and CO2 emissions**



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Why TBO



- **Increased flexibility**
- **Better predictability**
- **Leverages the best of the ground automation and the performance of the aircraft.**

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Procedures



- Use of ADS-B/CDTI
- Other cockpit capabilities to support aircraft avoidance
- Is still a research topic and will necessitate procedures development
- Including the roles of ANSPs

Procedures



- Decision support automation
- Automation-to-automation negotiation
- Information on accurate trajectory

Procedures



- **Human Factor Considerations**
- **Training and Qualifications Requirements**
- **Regulatory/Standardisation needs and Approval Plan (Air & Ground).**

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Checklist



- | | | |
|--------------------------------------|---|-------------|
| • Standards Readiness | - | 2025 |
| • Avionics Availability | - | 2028 |
| • Ground Systems Availability | - | 2028 |
| • Procedures available | - | 2028 |
| • Operations Approval | - | 2028 |

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Main dependencies



- Data Link En-Route
- Free routing
- FF-ICE
- Traffic Synchronization..

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Uniting Aviation on

Safety | Security | Environment

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