
International Civil Aviation Organization

ASBU/SIP/Lima/2012-WP/16E


## Aviation System Block Upgrades

### Module N° B0-15/PIA 1

#### Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN)

Workshop on preparations for ANConf/12 – ASBU methodology  
(Lima, 16-20 April 2012)

## Module N° B0-15



### Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN)

Summary	To manage arrivals and departures (including time-based metering) to and from a multi-runway aerodrome or locations with multiple dependent runways at closely proximate aerodromes to efficiently utilize the inherent runway capacity	
Main Performance Impact	-KPA-02 Capacity                      - KPA-04 Efficiency -KPA-09 Predictability              - KPA-06 Flexibility	
Applicability Considerations	Runways and Terminal Manoeuvring Area in major hubs and metropolitan areas will be most in need of these improvements.  Runway Sequencing procedures are widely used in aerodromes globally. However, some locations might have to confront environmental and operational challenges	
Global Concept Element(s)	TS – Traffic Synchronization	
Global Plan Initiative	GPI-6 Air Traffic Flow Management	
Global Readiness Checklist		Status
	Standards Readiness	Ready
	Avionics Availability	Ready
	Ground System Availability	Ready
	Procedures Available	Ready
	Operations Approvals	Ready

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## Module N° B0-15 - Baseline



- Manual process by which the air traffic controller uses local procedures and his expertise to sequence departures or arrivals in real time.

## Module N° B0-15 – Change Brought by the Module



- **Metering**
  - Arriving flights are “metered” by Control Time of Arrival (CTAs) and must arrive at a defined point close to the aerodrome by this time.
  - For departures, the sequence will allow improved start/push-back clearances, reducing the taxi time and ground holding,
- **Element 1 → AMAN**
  - Arrival management (AMAN) sequences the aircraft, based on the airspace state, wake turbulence, aircraft capability, and user preference. The smoothed sequence allows increase aerodrome throughput.
- **Element 2 → DMAN**
  - Departure management serves to optimize departure operation to ensure the most efficient utilization of aerodrome and terminal resources.
  - Slots assignment and adjustments will be supported by departure management automations. Departure management sequences the aircraft, based on the airspace state, wake turbulence, aircraft capability, and user preference, to fit into the overhead

## Module N° B0-15 – – Intended Performance Operational Improvement



<b>Capacity</b>	<ul style="list-style-type: none"> <li>-Optimizes usage of terminal airspace and runway capacity</li> <li>-Optimize utilization of terminal and runway resources</li> </ul>
<b>Efficiency</b>	<p>Harmonized arriving traffic flow from en-route to terminal and aerodrome through sequencing arrival flights; increased runway throughput and arrival rates.</p> <p>Streamline departure traffic flow and decreased lead time for departure request. Automated dissemination of departure information and clearances.</p>
<b>Predictability</b>	Decrease uncertainties in aerodrome/terminal demand prediction
<b>Flexibility</b>	Enables dynamic scheduling.
<b>CBA</b>	<ul style="list-style-type: none"> <li>-Business case built for Time Based Flow Management in US.</li> <li>- Case proves that benefit/cost ratio is positive</li> </ul>

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## Module N° B0-15 – Necessary Procedures (Air & Ground)



- The US TBFM and EUROCONTROL AMAN/DMAN efforts provide the systems and operational procedures necessary.
- In particular, procedures for the extension of metering into en-route airspace will be necessary.
- RNAV/RNP for arrival will also be crucial as well.

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## Module N° B0-15 – Necessary System Capability



- **Avionics**
  - No Avionics capability is required in support of the time-based metering for Departure.
  - For Approach time base metering is mainly achieved through ATC speed clearance to adjust the aircraft sequence in the AMAN.
- **Ground Systems**
  - Automation support is needed for the synchronization of arrival sequencing, departure sequencing, and surface information;
  - For AMAN/DMAN application, existing technologies can be leveraged, but require site adaptation and maintenance.

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## Module N° B0-15 – Training and Qualification Requirements



- Automation support is needed for Air Traffic Management in airspace with high demands. Thus, training is needed for ATM personnel.
- Training in the operational standards and procedures are required
- Likewise, the qualifications requirements are identified in the regulatory requirements in Section 6 which form an integral part to the implementation of this module..

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## Module N° B0-15 – Regulatory/Standardization Needs and Approval Plan (Air & Ground)



- Regulatory/Standardization: Updates required to current published criteria
- Approval Plans: To Be Determined.

## Module N° B0-15 – Reference Documents



- **Standards - NIL**
- **Procedures -NIL**
- **Guidance Materials**
  - European ATM Master Plan, Edition 1.0, March 2009, update in progress;
  - SESAR Definition Phase Deliverable 2 – The Performance Target, December 2006;
  - SESAR Definition Phase Deliverable 3 – The ATM Target Concept, September 2007;
  - SESAR Definition Phase Deliverable 5 – SESAR Master Plan, April 2008;
  - TBFM Business Case Analysis Report;
  - NextGen Midterm Concept of Operations v.2.0;
  - RTCA Trajectory Operations Concept of Use.
- **Approval Documents**

## Module N° B0-15 Implementation - Benefits and Elements



### Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN)

- **Benefits: Capacity, Efficiency, Flexibility and Predictability**
- **Elements:**
  - Metering
  - AMAN
  - DMAN

**To be reflected in ANRF**

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