Australia Indonesia Partnership
Kemitraan Australia Indonesia

AIR TRAFFIC FLOW MANAGEMENT/AIRSPACE MANAGEMENT

WORKING PAPER FOR WORKING GROUP 1




INDONESIA INFRASTRUCTURE INITIATIVE

Australia Indonesia Partnership

Kemitraan Australia Indonesia

WORKING PAPER FOR WORKING GROUP 1 - AIR TRAFFIC FLOW MANAGEMENT/AIRSPACE MANAGEMENT

INDONESIA INFRASTRUCTURE INITIATIVE

October 2010

INDONESIA INFRASTRUCTURE INITIATIVE

This document has been published by the Indonesia Infrastructure Initiative (IndII), an Australian Government funded project designed to promote economic growth in Indonesia by enhancing the relevance, quality and quantum of infrastructure investment.

The views expressed in this report do not necessarily reflect the views of the Australian Indonesian Partnership or the Australian Government. Please direct any comments or questions to the IndII Director, tel. +62 (21) 230-6063, fax +62 (21) 3190-2994. Website: www.indii.co.id.

ACKNOWLEDGEMENTS

This report has been prepared by LFV Aviation Consulting, who was engaged under the AusAID funded Indonesia Infrastructure Initiative (IndII) as part of the activity to contribute to the long term development of Indonesia by assisting the Directorate General Civil Aviation to develop sound, internationally harmonised proposals for future air navigation service delivery in the form of an Air Traffic Management Master Plan.

The support provided by working group participants is gratefully acknowledged. Any errors of fact or interpretation are solely those of the author.

Jakarta, 15 October 2010

TABLE OF CONTENTS

LIST OF FIGURES

ACRONYMS

AAMA	Australian Airspace Monitoring Agency
A-SMGCS	Advanced Surface Movement Guidance and Control System
ABAS	Aircraft-Based Augmentation System
ACC	Area Control Centre
ACT	Aviation Consulting Team
ADC	Aerodrome Control
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AFS	Aeronautical Fixed Service
AFTN	Aeronautical Fixed Telecommunication Network
AIDC	ATS Inter-Facility Data Communications
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
ATS	Air Traffic Services
AIM	Aeronautical Information Management
AMAN	Arrival Manager
AMC	Airspace Management Cell
AMHS	Aeronautical Message Handling System
AMSS	Aeronautical Mobile-Satellite Service
ANS	Air Navigation Services
ANSP	Air Navigation Services Provider
AO	Aerodrome Operations
AOM	Airspace Organisation Management
APAC	Asia Pacific
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
AP 1	PT Angkasa Pura 1
AP 2	PT Angkasa Pura 2
APP	Approach Centre
ASM	Airspace Management
ASEAN	Association of South East Asian Nations
ATC	Air Traffic Control
ATCC	Air Traffic Control Centre
ATCO	Air Traffic Control Operator
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATMSDM	ATM Service Delivery Management
ATN	Aeronautical Telecommunication Network
ATS	Air Traffic Services
AUO	Airspace User Operations
AWOS	Acquisition Weather Observation Stations
BLU	Public Service Agency
CAA	Civil Aviation Administration

CASR	Civil Aviation Safety Regulations
CBT	Computer Based Training
CDA	Continuous Descent Approach
CDM	Collaborative Decision Making
CDR	Conditional Route
CM	Conflict Management
CNS	Communications, Navigation and Surveillance
CPDLC	Controller-Pilot Data Link Communications
CTR	Control Zone
CVOR	Conventional VHF Omni-directional Range
CWP	Controller Working Positions
D-ATIS	Digital-Automatic Terminal Information Service
DCB	Demand and Capacity Balancing
DG	Director General
DGCA	Directorate General of Civil Aviation
DGAC	Directorate General of Air Communication
D-VOLMET	Digital Meteorological Information for Aircraft in Flight
DMAN	Departure Manager
DME	Distance Measuring Equipment
DVOR	Doppler VHF Omni-directional Range
FANS	Future Air Navigation Services
FDPS	Flight Data Processing System
FIR	Flight Information Region
FL	Flight Level
FMS	Flight Management System
FMP	Flow Management Position
FUA	Flexible Use of Airspace
GANP	Global Air Navigation Plan
GATMOC	Global ATM Operational Concept
GBAS	Ground-Based Augmentation System
GLONASS	Global Orbiting Navigation Satellite System
GNSS	Global Navigation Satellite System
GPI	Global Plan Initiative
GPS	Global Positioning System
GRBS	Ground-Based Augmentation System
HF	High Frequency
IATA	International Air Transport Association
IAVW	International Airways Volcano Watch
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
ICVM	ICAO Coordinated Validation Mission Report
IndII	Indonesian Infrastructure Initiative
ITU	International Telecommunication Network
JAATS	Jakarta Advanced Air Traffic Control System
KPI	Key Performance Indicators
LoA	Letter of Agreement

LVP	Low Visibility Procedure
MATSC	Makassar Advanced Air Traffic Control System
MET	Meteorological Services for Air Navigation
METAR	Meteorological Report
MLAT	Multilateration
MoT	Ministry of Transport
MSSR	Monopulse Surveillance Radar
MSAW	Minimum Safe Altitude Warning
MTCD	Medium Term Conflict Detection
NDB	Non Directional Beacon
NOTAM	Notice to Airmen
OPMET	Operational Meteorological Information
PBN	Performance Based Navigation
PSR	Primary Surveillance Radar
PRM	Precision Runway Monitoring
PRNAV	Precision Area Navigation
R&D	Research and Development
RPL	Repetitive Flight Plan
RMA	Regional Monitoring Agencies
RDPS	Radar Data Processing system
RNAV	Area Navigation
RNP	Required Navigation Performance
RNP AR	Required Navigation Performance Authorisation Required
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minimum
SARPs	Standards and Recommended Practices
SBAS	Satellite-Based Augmentation
SID	Standard Instrument Departure
SMS	Safety Management System
SSR	Secondary Surveillance Radar
SSP	State Safety Programme
STARs	Standard Instrument Arrival
STCA	Short Term Conflict Alert
SUP	Supplement
SWIM	System Wide Information Management
TLS	Target Level of Safety
TMA	Terminal Control Area
TOC	Table of Contents
TS	Traffic Synchronisation
VDL	VHF Digital Link
VCS	Voice Communication System
VFR	Visual Flight Rules
VHF	Very High Frequency
VHF-ER	Very High Frequency-Extended Range
VMC	Visual Meteorological Conditions
VOR	VHF Omni-directional Range
VSAT	Very Small Aperture Terminal

WGS-84	World Geodetic System — 1984
WAFS	World Area Forecast System
WRC	World Radio Communication Conferences
UTA	Upper Control Area

CHAPTER 1: INTRODUCTION

Law no. 1/2009 on Aviation requires that PT Angkasa Pura 1 (AP 1), PT Angkasa Pura 2 (AP 2) and the department of the Directorate General of Civil Aviation (DGCA) that provides Air Navigation Services (ANS) be merged into a single Air Navigation Services Provider (ANSP) and maintain the remaining part of DGCA as a Regulator. According to Law no. 1/2009, this shall be in force not later than January 2012.

This re-organisational work has started and a special taskforce managed by Director General of DGCA has been assigned with this task.

In order not to lose valuable time and resources, during the reorganisation process the following factors could be considered for the future Air Traffic Management (ATM) Planning and Project implementation:

- It is of outmost importance for Indonesia to cater for undisturbed and safe domestic and international air traffic in the region as well as facilitating for the international transit traffic over Indonesia.
- The Air Traffic Analysis Report (Deliverable 1) shows that there has been a great increase in domestic, international and transit traffic and an implementation of the Association of South East Asian Nations (ASEAN) Open Sky Policy will emphasise the need for ATM development even further.

The mission of supporting DGCA to develop an updated ATM Master Plan is contracted to the LFV Aviation Consulting Team.

The mission includes a transfer of knowledge to DGCA, AP1, and AP2 staff. By establishing working groups (WGs) where this staff can participate actively, this knowledge transfer process will be facilitated. Creating a WG for different domains with participation of in house experts also facilitates the production of a realistic and acceptable ATM Master Plan, which later on can be broken down into specific action plans. The meeting process in the four different WGs will result in four different Working Papers that will form one of the fundaments in the development of the final ATM Master Plan.

The ATM Master Plan will try to answer questions such as “What needs to be done?” and “When does it have to be done?” However, it will not answer the question “How will things be done?”

LFV Aviation Consulting Team is responsible for the WGs.

Experts from the following organisations/enterprises/agencies/associations have been invited to participate:

- DGCA/AP1/AP2 experts
- Civil Aviation Transportation Team (CATT) expert(s)

- International Air Transport Association (IATA) expert(s)
- Airservices of Australia expert(s)
- Other expert(s)

As an additional task assigned by the Indonesia Infrastructure Initiative (IndII)/SMEC and agreed by the LFV Aviation Consulting (LFV AC), a working paper will be established based on the WGs results, which will be part of the updated ATM Master Plan.

.The four WGs that have been established are:

- WG 1 – Air Traffic Flow Management (ATFM)/Airspace Management (ASM)
- WG 2 – Air Traffic Control (ATC)
- WG 3 - Communications, Navigation and Surveillance (CNS)
- WG 4 - Aeronautical Information Services (AIS)/ Meteorological Services for Air Navigation (MET)/Search And Rescue

See Annex 1 for info concerning WG 1 tasks and objective

See Annex 2 for participations on the WG meetings

See Annex 3 for Minutes from meetings

See Annex 4 for working paper from AP 2 concerning ASM/ATFM

See Annex 5 for Safety Management System issues

See Annex 6 for Human Resource Management issues

See Annex 7 for Comments from DGCA

CHAPTER 2: LINKS TO INTERNATIONAL CIVIL AVIATION ORGANISATION AIR NAVIGATION PLAN DOC 9750

The following Global Plan Initiatives (GPIs) are linked to the ATFM/ASM domain: GPI 1, 2, 3,4,6,7,8,10,

2.1 GPI-1 FLEXIBLE USE OF AIRSPACE

2.1.1 Scope

The optimisation and equitable balance in the use of airspace between civil and military users, facilitated through both strategic coordination and dynamic interaction.

Related Operational Concept Components: Airspace Organisation Management (AOM), Airspace User Operations (AUO)

2.1.2 Description of strategy

The use of airspace could be optimised through the dynamic interaction of civil and military air traffic services (ATS) including real-time civil/military controller-to-controller coordination. This requires system support, operational procedures and adequate information on civilian traffic position and intentions.

The concept of flexible use of airspace (FUA) is based on the principle that airspace should not be designated purely as civil or military, but rather as a continuum in which all user requirements are accommodated to the greatest possible extent. FUA should result in the removal of large areas of permanent or transient restricted airspace or special use airspace.

Where there are continued requirements to accommodate specific individual airspace uses, thereby blocking airspace of certain dimensions, this should be accommodated on a transient basis. Airspace should be released immediately after the operation requiring the restriction has been completed.

As reserved airspace is often established along critical flight paths at national boundaries, greater benefits associated with implementation of FUA will be obtained through inter-state cooperation which may entail regional and sub-regional agreements.

2.1.3 Current situation in Indonesia

Indonesian ATM (AP 1 and 2) has not implemented FUA according to the ICAO FUA concept. Airspace is still segregated between civilian and military airspace users and no real-time civil/military controller-to-controller coordination takes place. Military sectors (used for military air exercises) are blocked for civilian use even if the military airspace sector is vacant of military flights. Any airspace segregation should be of temporary nature only. This is not the case in Indonesia. This fact might reduce the available capacity in the Area Control Centres (ACCs) during peak hours, when less flexibility for the operational staff exists. In Europe it is common to establish and declare two different sector capacities, one when military units are using the airspace and one when they are not.

The ASM does not include a strategically, pre-tactical or tactical phase as a joint cooperation between ANSPs/Regulator/Military Units. Most likely this is the reason no operational procedures or system support have been developed to facilitate for FUA.

There are several Prohibited, Restricted and Danger (PR and D) areas and three Air Defence identification zones. The airspace is used in a segregated way.

Implementation of FUA and close civil/military coordination should benefit ATC capacity, and also fuel saving for civil aviation and have a positive environmental and economic impact for all stakeholders.

The Military Training Areas (MTAs) are mostly located where there are no ATS routes. Normally these areas are, while utilised by the military, blocked for civilian use. There is currently a need for a new civilian route from Jakarta to Bali, since the present first major portion of the route is shared by the intense traffic between Jakarta and Surabaya. During the visit to AP 2 it was discovered that this route is currently declared as one of the most traffic intense ATS routes in the world with more than 700 flights a week and the traffic forecast in the report on Air Traffic Analysis (Deliverable 1) shows a major increase of traffic. On an average, it means that there are more than 100 flights a day going back and forth Jakarta- Bali/Surabaya. A new route south of the present, which will penetrate an Air Defence Identification Zone, is urgently needed to add additional capacity for the major traffic flows between Jakarta and Surabaya/Bali. According to received information, this issue has been on the agenda for a rather long time since the military authorities are reluctant to accept penetrating civilian flights at any time and at any altitude. These procedures are not considered compliant to the concept of FUA.

FUA implementation recommendations/proposals will be included in the update of the Master Plan included enhanced civil/military cooperation/coordination.

There is a delegation in Natuna area, where ATS is delegated from Indonesia to Singapore and the area over the Christmas Island is delegated from Australia to Indonesia. An amended solution might be necessary during the coming 15 years in order to follow Law no. 1/2009.

Today the issue is more a political one concerning acknowledged border areas, than it is an ATM issue.

The ATM Master Plan will contain an activity for “Review of ATS routes in the Short Term” and also an “Airspace and ATS routes review in the Medium Term”.

2.1.4 Comments from stakeholders:

Comments from CATT:

The recommendation for DGCA, AP 1 and AP 2 to work with the military to discuss operational improvements across the Jakarta-Surabaya-Denpasar route is supported. IndII should also consult the military before discussing the potential adoption of FUA.

Comment from IATA:

The military needs to retain the right to have access to all airspace in order to perform its surveillance, defence, and security functions. The military also needs to have airspace access with the purpose of conducting training exercises. However, when military operations requiring airspace restrictions have been completed, lost capacity could be regained by making airspace available to other users through the FUA concept. FUA is based on the principle that airspace should accommodate the requirements of all users to the greatest extent possible, without relying on a pure designation of airspace as civil or military. Airspace could be optimised dynamically by blocking areas to accommodate specific operations on a transient basis and releasing restrictions otherwise. Implementing FUA requires extensive real-time coordination between civil and military ATS and across national boundaries.

Airlines are capable today of using advanced navigation systems to achieve more accurate performance in all phases of flight. Developing a strategy based on FUA would enable airline benefits such as the ability to file and fly a preferred trajectory and decreased fuel consumption and CO2 emissions. System benefits would include improving airspace safety, predictability, capacity, and throughput. Further, FUA would enable full utilisation of existing aircraft and ATM technologies.

However, not all the aircraft in operation in Indonesia are capable of performance based navigation, therefore limiting the use of FUA.

Note: The fleet census should be a key element of the ATM Master Plan and Air Traffic forecast. We have not been able to identify if such census has been done or not by the consultant.

Comments from kick-off meeting:

Associated with GPI-1, the consultant suggested that Indonesia has to implement FUA between the military and civilian, as already mandated in Law no. 1/2009 and ICAO.

This would be difficult to realise in a short time and must begin with a discussion at high levels. The consultant has had a similar experience in Thailand**. The Forum was pessimistic about this, but agreed that this issue should be included in the Master Plan.**

For the WG to elaborate on:

1	Implementation of FUA is fundamental for future ATM Performance. A high level agreement on a strategic level is therefore needed between Ministry of Transport (MoT)/DGCA and Military Authorities in Indonesia that ratifies this concept. Coordination on a pre-tactical (day before) and tactical level (day of operation) is also required. Direct speech facilities between ANSP and military operational units must be catered for in order to facilitate real time coordination.
2	ICAO Doc 4444 Chapter 3 recommends implementation of FUA as one possibility to increase sector capacity in ACC sectors.
3	Law no. 1 on Aviation - Article 7 and Elucidation Article 7 *

*****

Law no. 1 on Aviation article 7:

(1) In the framework of implementation of the responsibilities as meant in Article 6, the Government stipulated prohibited and restricted areas for air space.

(2) Indonesia's aircraft or foreign aircraft shall be prohibited flying through prohibited areas.

(3) The flying prohibition as meant in item (2) is of permanent and holistic nature.

(4) The restricted areas as meant in item (1) may only be utilised for aviation of state aircraft.

Elucidation of Law no. 1 on Aviation article 7:

Item (1) The authority to determine prohibited and restricted areas of air space belongs to every sovereign state in regulating utilisation of its air space aiming in the frame of general public safety, aviation safety, national economy, living environment, and defense and security. What is meant by "prohibited area" is an air zone with permanent and holistic restriction for all aircraft. This limitation shall only be stipulated within the air space of Indonesia, for example: nuclear installation or the Presidential Palace. What is meant by "restricted area" is the air/space zone with non-permanent restriction and utilised for certain aviation operation (TNI/Indonesia Military aircraft). ***This area may be utilised for civil aviation during non-active (military) period(s).*** *This restriction may be in the form of altitude restriction and is only stipulated within the air territory of Indonesia, for example: military installation or zones.*

Comments from consultants:

Discussions concerning FUA were an essential part of the discussions and the WG realised the benefits from this concept. Backed-up by the article 7 in the Law no. 1 of Aviation and also the elucidation of this article, the ATM system in Indonesia has a legal base to introduce this concept. Introduction and development of FUA will definitely be a part of the ATM Master Plan.

2.2 GPI-2 REDUCED VERTICAL SEPARATION

2.2.1 Scope

The optimisation of the utilisation of airspace and enhanced aircraft altimetry systems.

Related Operational Concept Components: AOM, Conflict Management (CM)

2.2.2 Description of strategy

Reduced vertical separation minima (RVSM) reduces vertical separation to 300 m (1,000 ft) above Flight Level (FL) 290 from the current 600 m (2,000 ft), thereby providing six additional FLs. The manual on implementation of a 300 m (1,000 ft) vertical separation minimum between FL 290 and FL 410 (Doc 9574) provides specific guidance on implementation of RVSM.

A great deal of experience has been gained with RVSM, and all necessary Standards and Recommended Practices (SARPs) guidance material are available to support implementation.

2.2.3 Current situation in Indonesia

The Indonesia RVSM program is monitored by Australian Airspace Monitoring Agency (AAMA).

AAMA is one of a number of organisations that ICAO has approved as Regional Monitoring Agencies (RMAs) following global implementation of RVSM. These agencies ensure the safe use of specific airspace designated by regional agreement.

RMAs assess how successfully the airspace meets the agreed Target Level of Safety (TLS). The target is determined by ICAO and depends on satisfactory aircraft height-keeping performance and measurement of risk associated with operational errors.

The AAMA also:

- collects traffic samples and assesses collision risk in the Brisbane, Honiara, Jakarta, Melbourne, Nauru, Port Moresby and Ujung Pandang Flight Information Regions (FIRs) and reports results to state authorities and ICAO;
- identifies non-RVSM approved operators that are incorrectly operating in airspace where RVSM is applied and notifies the relevant state approval authority;
- facilitates the transfer of approval data and monitoring data to and from other RVSM RMAs; participates in international meetings that relate to safety assessment and monitoring; and
- facilitates a height-keeping performance monitoring service for assessing compliance of operators and aircraft with RVSM height-keeping performance requirements.

There are many RVSM issues to be dealt with in Indonesia today. The RVSM approvals database is managed by DGCA. The Aeronautical Information Publication (AIP) still has not been updated to include RVSM requirements; although there is an AIP Supplement (SUP) which now has a lot of outdated information (AIP SUP 07/03 dated 20 September 2003). Because Indonesia uses an exclusive RVSM model, the assumption is made that all aircraft that flight plan at RVSM levels are RVSM approved and capable, even if they do not include a W in their flight plan. The extensive use of Repetitive Flight Plans (RPLs) is also a problem for RVSM-monitoring.

The operational procedures for “Suspension of RVSM” are not known to the LFV Aviation Consulting Team at this stage. Tentative RVSM shortcomings, such as presentation of RVSM status from the Flight Plan information (strip and/or label) for the ATC, will be included in the updated Master Plan.

2.2.4 Comments from stakeholders

Comments from CATT:

More detailed actions should be included in the ATM Master Plan to address the identified concerns with the implementation of RVSM. AAMA should be contacted to provide any further suggestions for improvements.

Comments from kick-off meeting:

In connection with GPI-2, DGCA declared RVSM has been implemented in Indonesia. Consultant questioned the procedure of “suspension of RVSM”, and AP1 and AP2 said that they already have such procedures.

For the WG to comment on: AAMA will be contacted to provide input concerning status and enhancement areas if needed.

Comments have been received from AAMA and were presented during the second meeting:

1. *The AAMA is planning to introduce long-term height monitoring for RVSM approved aircraft in accordance with ICAO requirements in early 2011. Further introduction of Automatic Dependent Surveillance – Broadcast (ADS-B) for operators in that airspace would be of great assistance and reduce costs associated with on-board height monitoring systems.*
2. *Focused implementation of a broad-based operational error reporting system along with a just cultural environment would greatly assist in the assessment of risk in the Jakarta and Ujung FIRs.*
3. *Transition from the broad use of repetitive flight plans by operators to one of automated scheduled plans would provide greatly improved visibility to ATC to know exactly what type of aircraft is operating a route and in particular which particular airframe is operating a flight. Currently, the AAMA has significant problems identifying this information for monitoring purposes.*

2.3 GPI-3 HARMONISATION OF LEVEL SYSTEMS

2.3.1 Scope

The adoption by all states of the ICAO FL scheme based on feet as contained in Appendix three to Annex 2 - Rules of the Air.

Related Operational Concept Components: AOM, CM, AUO

2.3.2 Description of strategy

The majority of ICAO contracting states have chosen to use the imperial measurement system for referencing altitudes and levels; however, some states continue to use the metric system. To compound matters, some states that use the metric system have adopted different vertical spacing standards than what is contained in ICAO Annex 2 - Rules of the Air.

Aircraft registered in states that have adopted the imperial system have altimetry systems calibrated in feet. Those registered in states that have adopted the metric system generally have altimeters calibrated in metres. Aircraft operating across boundaries into states with differing systems are required to carry additional altimeters or to use conversion charts. ATCs handling such flights are also required to use conversion charts.

The implementation of RVSM at the interface between states using the different systems has increased safety concerns and caused the loss of several levels resulting in a less efficient operation for aircraft and a loss in airspace capacity. In addition, certain

states that utilise the metric system have not made certain high-level cruising altitudes available, thereby imposing significant operating restrictions on aircraft operating on long-range sectors.

Harmonisation of level systems, whereby all states adopt the ICAO FL scheme based on feet, should be pursued.

2.3.3 Current status in Indonesia

Indonesia is fully compliant with ICAO FL scheme as well as adjacent centres. The same is valid for implementation of RVSM, so Indonesian ACCs don't have to adapt to different systems in the interface with other states. The implementation of RVSM adding six new FLs above FL 290 of course has generated additional capacity in the ATM System.

2.3.4 Comments from stakeholders

Comments from kick-off meeting:

For the next GPIs discussion, there is no significant comment from the WG participants. But note from discussion, there are some flights (including international flights) which gives no flight plan to ATC (e.g., AirAsia from Malaysia). This problem also occurs in flights from small airports.

For the WG to elaborate on:

What is the problem? Is it AIS or Airspace User related? WG4 will deal with this issue as well.

Comments from consultants:

The problem with the missing flight plans were discussed in several groups and will be addressed in the ATM Master Plan. Indonesia Transport Safety Assistance Package (ITSAP) has made a report on the Flight Plan process including a review of readiness for the format change of the ICAO FPL 2012 in Indonesia, which will be studied. ITSAP is also holding a four day workshop in Jakarta for stakeholders concerning all aspects of the Flight Plan.

2.4 GPI-4 ALIGNMENT OF UPPER AIRSPACE CLASSIFICATIONS

2.4.1 Scope

The harmonisation of upper airspace and associated traffic handling through application of a common ICAO ATS airspace class above an agreed division level.

Related Operational Concept Components: AOM, CM, AUO

2.4.2 Description of strategy

To the extent possible airspace should be structured as a continuum, free from operational discontinuities, inconsistencies and differing rules and procedures. Alignment of airspace classifications can help to achieve this goal. It would also facilitate the introduction and better utilisation of data link communications, improved flight plan processing systems, and advanced ASM coordination tools and message exchange capabilities, leading to progressively more flexible and dynamic management of airspace. Airspace classifications should be harmonised intraregional and, where possible, across several regions.

Air transport and most business aircraft operations should be contained within airspace within which positive ATC services are provided to all aircraft (i.e. Class A, B, C or D).

ATM provided in various airspace volumes should be based on the ICAO airspace classification system as defined in Annex 11 - ATS (i.e. Class A to G), and those classifications should be implemented on the basis of a safety assessment, taking into account the volume and nature of the air traffic.

2.4.3 Current status in Indonesia

Division FL between upper and lower airspace is FL 245.

Airspace classification is regulated in Civil Aviation Safety Regulation (CASR) 170 published in AIP and consistent with options given in Law no. 1/2009 on aviation.

An assessment whether current airspace classes are optimum for Indonesia will be further elaborated.

2.4.4 Comments from stakeholders:

Comments from CATT:

While the alignment of upper airspace classification has been achieved, comments are required on the overall Indonesian airspace design, the appropriateness of current airspace classes and suggestions for improvement.

Comments from kick-off meeting:

There is an uncertainty whether the classification "F" in portions of the Indonesian airspace is sufficient or not. There has been a request to create more controlled airspace, which needs to be clarified.

For WG to elaborate on:

1	Is the airspace design currently appropriate with regard to traffic flow and the established airspace classes?
2	Is the controlled airspace sufficient starting at FL245?

Comments from consultants:

The consultants did not get a real picture whether the present airspace design and classifications were at an optimum level, but will elaborate more on this issue in the ATM Master Plan.

2.5 GPI-6 AIR TRAFFIC FLOW MANAGEMENT

2.5.1 Scope

The implementation of strategic, tactical and pre-tactical measures aimed at organising and handling traffic flows in such a way that the totality of the traffic handled at any given time or in any given airspace or aerodrome is compatible with the capacity of the ATM system.

Related Operational Concept Components: AOM, Aerodrome Operations (AO), Demand and Capacity Balancing (DCB), Traffic Synchronisation (TS), CM, AUO

2.5.2 Description of strategy

The implementation of demand/capacity measures, commonly known as ATFM, implemented on a regional basis where needed, will enhance airspace capacity and improve operating efficiency.

In the event that traffic demand regularly exceeds capacity, resulting in continuing and frequent traffic delays, or when it becomes apparent that forecast traffic demand will exceed the available capacity, the appropriate ATM units, in consultation with aircraft operators, should consider implementing steps aimed at improving the use of the

existing system capacity and developing plans to increase capacity to meet the actual or forecast demand. Any such planning to increase capacity should be undertaken in a structured and collaborative manner.

Where warranted, states and regions should evolve to a collaborative-based approach to capacity management. The ATM operational concept envisages a more strategic approach to ATM overall, and through collaborative decision-making (CDM), a reduction in the reliance on tactical flow management. It is inevitable that tactical flow intervention will continue to be required; however closer coordination between airspace users and ATM service providers can reduce the need for routine tactical intervention which is often disruptive to aircraft operations.

2.5.3 Current situation in Indonesia

There is no ATFM in operation in Indonesia today. That means that there is nil or limited protection for system overload as well as ATC overload. This fact has a major impact on safety within the ATM domain in Indonesia.

The AP 1 and AP 2 headquarter as well as ACC/Approach Centre (APP) Jakarta expressed their urgent need for actions in this domain (Pre-tactical/Tactical).

A first interim solution could be to establish a Flow Management Position (FMP) co-located with the ATS coordinator in the respective ACC with defined duties and mandate.

ATFM recommendations/proposals will be included as an early action in the update of the ATM Master Plan.

Currently, the only tool to regulate air traffic flows is the agreed Letters of Agreement (LoA's) between Indonesia and adjacent centres stating separation standards. However, those separation criteria are based on the level of CNS and ATM system capacity available.

Traffic inbound Jakarta Soekarno-Hatta airport during peak hours needs quite urgently to be regulated coordinated with airport authorities and airlines.

In APANPIRG/20 meeting, a conclusion (20/12) was to adopt an ATFM communications handbook for the APAC (Asia/Pacific) region. The primary goal of this guidance material is to promulgate appropriate terminologies and phraseologies for the exchange of written and verbal ATFM messages between units providing ATFM services, both within states and between states.

2.5.4 Comments from stakeholders

Comments from CATT:

The discussion of ATFM needs to discuss implementation enabling activities, what changes are needed in current flight planning processes, the implementation of a single national Flight Data Processing (or what is needed to integrate both FDPs) and what processes are needed to establish the proposed coordination with airports and airlines.

Comments from kick-off meeting:

For WG to elaborate on:

Short term: Implement FMP at both ACC. Medium term: maintain FMP and implement a centralised ATFM unit for all Indonesia, might be co-located with an Airspace Management Cell (AMC) if implemented. Long term: Indonesia to join a Centralised Flow Management Unit for South east Asia if implemented in the APAC Region

Comment from consultants: This issue is vital for future ATM in Indonesia and will be part of the ATM Master Plan. Activities to accommodate implementation of ATFM in Indonesia will be identified and recommended in the ATM Master Plan.

2.6 GPI-7 DYNAMIC AND FLEXIBLE ATS ROUTE MANAGEMENT

2.6.1 Scope

The establishment of more flexible and dynamic route systems, on the basis of navigation performance capability, aimed at accommodating preferred flight trajectories.

Related Operational Concept Components: AOM, AUO

2.6.2 Description of strategy

The implementation of ATS route structures that avoid concentrations of aircraft over congested points and implementation of an ATS routing environment that meets the needs of the airspace users to operate along preferred and dynamic flight trajectories will increase capacity and increase aircraft operating efficiency.

Area Navigation (RNAV) routes are not restricted to the location of ground-based aids and provides benefits to aircraft operators and the ATM system. All modern aircraft are RNAV capable, and efforts should be made to design and implement RNAV routes.

Dynamic route management involves the aircraft in the planning process. Typical scenarios include the generation of change-of-routing requests by the dispatch functions of the aircraft operators, the processing and approval of these requests by ATS providers and transmission of the change-of-routing approval to the aircraft. Advanced scenarios would have the aircraft making requests directly to ATS providers who would process and modify the request if necessary and then forward the approved route to aircraft and affected service providers along the route of flight.

Random routing strategically or pre-tactically defines areas within which fixed routes are not designated and where aircraft determine an appropriate track from an entry point to an exit point.

User-preferred routes make use of the capability of aircraft operators to determine optimum tracks, based on a range of flight parameters. In accordance with this concept, ATS routes or tracks would not be fixed to pre-determined routes or waypoints, except where required for control purposes, however, trajectories would be available to ATM staff.

User-preferred routing requests are generated by the airspace user or their dispatch functions and submitted to the ATS provider for approval or renegotiation if a conflict results from their transmission to aircraft. Advanced scenarios would have the aircraft making requests directly to ATS providers who would process and modify the request if necessary and then forward the approved route to aircraft.

2.6.3 Current situation in Indonesia

Currently, approximately 15 RNAV routes are used for international traffic. Many domestic conventional routes and pioneer routes have been established during the last five year planning cycle in order to connect more airports in the country. These pioneer routes are available only for Visual Flight Rules (VFR) operations.

One domestic route will be established as a RNAV route. All domestic airlines are eager to operate on this route. However, there is a staff shortage of airworthiness inspectors that can certify both aircraft avionics and pilots eligible to fly RNAV. This could without proper actions lead to a bottleneck issue, when Performance Based Navigation (PBN) is introduced on a large scale.

All conventional routes in the upper airspace are also superimposed as RNAV routes, meaning that all waypoints based on terrestrial navigational aids also are described as lat/long waypoints based on World Geodetic System – 1984 (WGS 84). This means those routes will each have two names, one as a conventional route and one as a RNAV route (L, M or N). This step can be seen as a start of PBN implementation in the country. The next step is to create more routes according to user requirements, where there are no ground-navigational aids to guide the route trajectory.

During interviews with DGCA staff it became known that there are plans however to only have RNAV routes in the upper airspace and the conventional ones in the lower airspace. (This is not confirmed by the management).

One of the major ingredients in flight efficiency for the airspace users is the possibility to flight plan and execute the flight as direct and short as possible. This option also provides a more environmental sustainable solution by reducing the greenhouse gas emissions. By constructing the ATS routes by means of conventional ground aids puts many constraints on requirements from users, flying new destinations etc. Therefore, with this growing traffic demand in Indonesia, both for domestic and international use, it is important to increase the amount of RNAV routes. For international traffic almost all airframes are eligible to fly these routes and domestic airline companies must equip their airframes with adequate navigational equipment based on satellite techniques.

From an ATM infrastructure viewpoint a lot of navigational ground aids with high maintenance costs can be dismantled, bringing the CNS/ATM costs beneficial also for the airspace users.

The updated ATM Master Plan will give this topic high priority.

2.6.4 Comments from stakeholders

Comments from CATT:

User Preferred Trajectories (UPT) is a very advanced concept that is a long-term improvement. The application of RNAV depends on the equipment fitted to the aircraft, the training of the aircrew, the ability to design the appropriate routes and the regulator's ability to conduct all the necessary licensing and oversight activities. The ATM Master Plan needs to consider airline equipage plans, specific routes where RNAV will bring benefits and advise on all other enabling activities required to be conducted. The analysis of current navigational aids needs to consider the needs of all airspace users.

Comments from kick-off meeting:

Comments from consultants:

User Preferred Routes and thereafter UPT (4D) needs to be implemented as a part of the FUA. Airspace should also be dynamically managed in the long term. Whether this should be within the scope of the updated ATM Master Plan will be further elaborated.

2.7 GPI-8 -COLLABORATIVE AIRSPACE DESIGN AND MANAGEMENT

2.7.1 Scope

The application of uniform airspace organisation and management principles on a global basis, leading to a more flexible airspace design to accommodate traffic flows dynamically.

Related Operational Concept Components: AOM, AUO

2.7.2 Description of strategy

Collaborative airspace design and management is aimed at organising airspace in a cooperative manner involving all users so that airspace is managed to accommodate the preferred trajectories of the users. States and regions should take advantage of aircraft capabilities when designing airspace. In designing and implementing airspace changes, the fleet capabilities among airspace users within a given airspace need to be taken into account. Furthermore, collaboration with airspace users will identify procedures and/or solutions that make use of available aircraft capabilities.

Other emerging developments such as CDM, the “required time of arrival” function in the flight management system (FMS), the endorsement of the global ATM operational concept and the implementation of data link applications, will also allow improved airspace design and management.

Over an evolutionary period, dynamic ASM should be applied where significant benefits would be gained. Dynamic ASM comprises integrated decision making; and demand-based capacity. Integrated decision making is an extension of the principles of the flexible use of airspace to include airspace users in flight in decision making with respect to tactical assessment of the use of reserved airspace and requirements for transit times of special use airspace.

Aircraft FMS can provide information on estimated time en-route for proposed route changes. In addition, data link communication through controller-pilot data link communications (CPDLC), providing the ability to uplink and downlink flight planning information, can support deployment of integrated decision making.

2.7.3 Current situation in Indonesia

All airspace design and management is static and no flexibility exists in the usage of the available airspace. Re-sectorisation of airspace is a complicated, long procedure, which results in a new static airspace design. There is no flexible use of airspace currently and no way to measure the demand and balance it with the available capacity. No sector capacity is declared and there is no structured way of measuring the demand in due

time to be able to regulate traffic if needed. Flight plans have to be submitted only one hour prior to estimated departure times.

Dynamic ASM requires integrated or CDM, where all stakeholders' (civilian/military airspace users together with ANSP/Military Units) requirements will be assessed before a tactical integrated decision is made. CDM will be supported by CPDLC, which is in an implementing phase in parts of the Indonesian airspace.

2.7.4 Comments from stakeholders

Comments from CATT:

Dynamic ASM and CDM are advanced concepts. The ATM Master Plan needs to provide actions needed to calculate the capacity of current air routes, airspace volumes and airports.

Consultant remark: Calculation of capacity for airports is not a task for the ATM Master Plan, outside the ToR.

Comments from IATA:

CDM brings together airlines, civil aviation authorities and airports in an effort to improve ATM through information exchange and data sharing between stakeholders. The objectives of CDM are to develop common situational awareness between partners of flight progress in the air and on the ground and to make air traffic more predictable due to timely and accurate shared information.

Many tools can be used to achieve a better communication between all the stakeholders; however, CDM is based on data sharing and also an improvement of the quality of the data exchanged between the users.

As recommended by the Consultant, CPDLC will improve the communication air-ground but will do little to share information with airports, the Civil Aviation Administration (CAA) and the airlines operation centres. The use of CPDLC is recommended over the ocean and in region outside of Very High Frequency (VHF) coverage.

IATA supports CPDLC deployment as the primary means of communication in oceanic and remote airspace where the quality of voice communications is often poor. At the same time, CPDLC should be gradually introduced to busier en-route and terminal airspace in order to relieve voice communications. CDM is a relatively new concept and is one of the key concepts proposed as part of Single European Sky ATM Research (SESAR) and NextGen programs.

Comments from kick-off meeting: None

For WG to elaborate on:

Is there currently any CDM between airports, airspace users and ATM in Indonesia?

Comments from consultants:

A CDM activity concerning airport slot allocation on the seven largest airports in Indonesia had its first meeting on the second meeting day. Stakeholders from airport, ATM (DGCA, AP 1 and 2) and a representative from Garuda Indonesia, also here representing IATA are part of this CDM team. Hopefully, some CDM activities for these seven airports will be initiated in the very short term.

2.8 GPI-10 TERMINAL AREA DESIGN AND MANAGEMENT

2.8.1 Scope

The optimisation of the terminal control area (TMA) through improved design and management techniques.

Related Operational Concept Components: AOM, AO, TS, CM, AUO

2.8.2 Description of strategy

There are many ways by which a well designed and managed TMA can have an important impact on safety, capacity and efficiency. TMA design should be implemented uniformly across all TMAs within a state or region and should provide benefits while minimising pilot/controller communications and optimising pilot and controller workload. TMA arrival acceptance rates should be based tactically on a CDM process involving tower, TMA and en-route sectors, while strategically involving airspace users, to ensure optimum traffic handling.

The enhancement of TMA management includes:

1) Complete implementation of WGS-84
2) Design and implementation of optimised RNAV and Required Navigation Performance (RNP) arrival and departure procedures (see also RNAV and RNP (Performance-based navigation GPI-5)
3) Design and implementation of RNP-based approach procedures
4) Enhanced traffic and capacity management.

The implementation of dynamic TMA management procedures may comprise several elements such as dynamic wake vortex detection and mitigation, and collaborative capacity management.

At those locations where a business case supports implementation, decision support tools should be developed and implemented to provide a more structured and efficient management of arrival and departure traffic flows and more efficient use of the runway(s), more fuel-efficient trajectories and reduced noise exposure.

2.8.3 Current situation in Indonesia

Design of major terminal areas in Indonesia is not optimal with regard to present and future traffic demand. Capacity to handle the departing/arriving traffic will be increased by proper airspace design for the TMAs. In and outbound traffic to/from an airport should be laterally separated when possible to reduce workload for ATC, thereby increasing overall capacity. Standard Instrument Departures (SIDs)/ Standard Instrument Arrivals (STARs) based on RNP and RNAV or even Precision Area Navigation (PRNAV) criteria (i.e. RNP 5 and RNP 1) require the aircraft fleet using the airport to be properly equipped. The higher navigational precision provides possibilities to reduce the lateral separation between the SID and STAR, saving valuable distance for the airspace users. Using SID/STAR also reduces the radio communication between ATC and cockpit.

Traffic handling in a major TMA like Jakarta would be much facilitated by some sequencing of inbound traffic from en-route sectors. Therefore an Arrival Manager (AMAN) will be necessary and eventually even a Departure Manager (DMAN) regulating the departure traffic. These sequencing tools are not implemented currently in Indonesia.

By the implementation of PBN in Indonesia, major cost savings will be possible for the whole aviation industry. For the airspace users the result will be shorter trajectories leading to less fuel consumption, less greenhouse gas emissions and for the ATM infrastructure owner, less need for investments in costly ground aids and maintenance. The overall capacity will increase when lateral separation will be reduced by higher precision offered by PBN.

An APAC Regional PBN Implementation Plan was adopted as a conclusion 20/41 on Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG)/20.

2.8.4 Comments from stakeholders

Comments from CATT:

The ATM Master Plan needs to identify actions required to design RNP and RNAV procedures and where improved use of SIDs/STARs would bring immediate benefits. The ATM Master Plan needs to identify the enabling activities to allow the adoption of DMAN and AMAN and the relationship with a national flow management capability.

The ATM Master Plan should also discuss the use of aerodrome capacity studies as short term steps which could assist in maximising current airport capabilities.

Consultant remark: Calculation of capacity for airports is not a task for the ATM Master Plan.

Design of RNP and RNAV and improved use of SIDs/STARs is of high priority and will be included in the Medium term Master Plan activities.

Comments from kick-off meeting:

For WG to elaborate on:

Which TMAs are in need of RNP/RNAV SIDs/STARs, as a capacity enhancing measure?

Comment from consultants:

Some TMAs (Jakarta, Surabaya) need to increase capacity rather soon in order to cope with growing traffic. Activities to accommodate this will be developed in the ATM Master Plan.

2.9 GPI-13 AERODROME DESIGN AND MANAGEMENT

2.9.1 Scope

The implementation of management and design strategies to improve movement area utilisation.

Related Operational Concept Components: AO, CM, AUO

2.9.2 Description of strategy

Improved aerodrome design and management activities, including coordination and collaboration between ATM providers, vehicle operators and aircraft operators can have an important impact on safety and capacity at aerodromes.

Local CDM processes should lead to sharing of key flight scheduling data that would enable all participants (aerodrome, ATC, ATFM, aircraft operators and ground handling) to improve their awareness of aircraft status throughout the “turn around” process. This will allow minimal and precise ATFM measures to be applied and higher predictability of schedules to be achieved. Benefits would include more efficient use of aerodrome resources and ground handling, reduction in delays and greater predictability of schedules.

As an integral part of the air navigation system, the aerodrome will provide the needed ground infrastructure including, inter alia, lighting, taxiways, runway and runway exits, and precise surface guidance to improve safety and to maximise aerodrome capacity in all weather conditions. The ATM system should enable the efficient use of the capacity of the aerodrome airside infrastructure. To ensure optimum use of aerodromes:

- runway occupancy time should be reduced where capacity and efficiency benefits would be gained;
- the ability to safely manoeuvre in all weather conditions whilst maintaining capacity should be sought;
- where warranted, precise surface guidance to and from a runway will improve capacity and efficiency; and
- the position (to an appropriate level of accuracy) and intent of all vehicles and aircraft operating on the manoeuvring and movement areas should be known and available to the appropriate ATM community members at those aerodromes where a cost-benefit analysis shows that substantial capacity and efficiency gains would be achieved.

2.9.3 Current situation in Indonesia

Aerodromes operate autonomously vis-à-vis the ATM Community. This lack of CDM process between airport, ATM (including of course ATFM) and aircraft operators is a hindrance for a positive development of a full gate-to-gate process. Aerodrome design inclusive of all necessary ground infrastructure on the main aerodromes must be improved in order to cope with the increasing demand of aircraft operations.

The need of Advanced Surface Movement Guidance and Control System (A-SMGCS) for Jakarta Soekarno-Hatta airport will be included in the updated Master Plan. Together with the "counterpart team" the LFV Aviation Consulting Team will investigate if it is likely that there are additional needs and if there could be cost benefit found for other airports during the Master Plan period.

At Jakarta Soekarno Hatta airport the international terminal is located in the northern part, which is easier to proceed to if the northern runway is used. If runway 07R should be used for this international flight, the aircraft have to taxi a long way to reach the intended terminal.

If ATC is using runway 07R for landing and an international flight is coming in, it is common for ATC to facilitate for this flight to reach its terminal to let it land on runway 07L instead, where you have planned your departures. This mix of procedures, not having a standard procedure to follow, may be an issue of grave safety concern. The LFV Aviation Consulting Team, during their stay in Jakarta, was informed about an incident that occurred very recently at Jakarta's airport. With the ambition from ATC to facilitate for an arriving international flight it was directed to the northern runway, where a departing aircraft did not take off in due time. There should also be a study to

find out the runway capacity and means to monitor and act if this capacity value will be exceeded. This will also be an issue for the updated ATM Master Plan as a recommendation for special airport studies.

2.9.4 Comments from stakeholders

Comments from CATT:

The ATM Master Plan needs to identify actions required to conduct airport capacity studies.

Comment from consultants: Airport capacity studies are not part of theToR

For WG to elaborate on:

Is there an additional need for A-SMGCS at other major airports and could Multilateration (MLAT) be an option?

Comment from consultants: The meeting discussed whether Surabaya as well as Jakarta Airport was in a need for A-SMGCS. The issue will be reflected in the ATM Master Plan and the consultants will try to identify common criteria for additional surveillance capability requirement such as A-SMGCS at airports.

2.10 GPI-14 RUNWAY OPERATIONS

2.10.1Scope

Maximise runway capacity.

Related Operational Concept Components: AO, TS, CM, AUO

2.10.2Description of strategy

Enhancing the performance of runway operations begins with the establishment of runway capacity benchmarks which are usually defined as the maximum number of flights an aerodrome can routinely handle in an hour for above Category I weather minimum. These benchmarks are estimates that vary with runway configurations and the mix of aircraft types. Where warranted, it should be an objective to utilise aircraft capabilities and available runways in the most appropriate manner to move the all weather throughput at as close to the levels of visual throughput as possible.

Achieving the optimum capacity for each runway is a complex task involving many factors, both tactical and strategic. In order to effectively manage that task it is

essential to measure the effects of operational changes and to monitor performance of the airspace users and ATM providers. The latter case will be applicable to the analysis of pilot and controller performance and must recognise the requirement to maintain the confidence of-the users and to work within the existing culture of safety. A system of performance indicators that forms the basis of measurements and analyses should be devised. Tactical factors affecting runway occupancy include flight operations and ATM factors. The flight operations aspects include operator performance, effects of company procedures, use of the airfield infrastructure, and aircraft performance issues.

Runway capacity constraints are defined by, inter alia, procedures, runway physical characteristics, aircraft performance capabilities, surveillance capabilities, aircraft spacing, weather limitations, environmental restrictions and surrounding land use management. Improved procedures for minimising spacing such as reduced runway separation, precision runway monitoring (PRM) and RNP+-approaches for closely-spaced parallel runways will optimise spacing capability.

2.10.3Current situation in Indonesia

Coordination between AIS and ATS authorities is defined in CASR 170.021.

Jakarta Soekarno Hatta airport has a capacity of 54 movements/hour. (This is however not verified by any document stating this). Whether the other major airports, i.e. Surabaya, Bali, Medan etc. have declared a maximum hourly throughput of traffic is not clear at this point for the LFV Aviation Consulting Team.

Implementation of A-SMGCS and PRM and RNP+ approaches, for closely-spaced parallel runways will be recommended in the updated ATM Master Plan when so required based on demand capacity balance. Implementation of a MLAT system could be an option to consider.

Taxiway structure combining the two parallel runways at Jakarta airport is not efficient and will most likely have to be put into a specific Airport Design study. Such a study will most likely also contain other major airports in the country.

To expedite throughput of traffic taxiways have to be constructed to facilitate for rapid exits of runway, with the aim to reduce the runway occupancy time. Such actions will be of great importance in order to accommodate forecasted traffic growth and to reduce the risk for airports to be future “bottlenecks” for aviation in Indonesia. When the ASEAN Open Sky policy is fully implemented the traffic load on the airports could increase even further.

2.10.4Comments from stakeholders

Comments from CATT:

The ATM Master Plans needs to identify actions required to conduct runway and taxiway capacity studies.

Consultant remark: Calculation of capacity for airports is not a task for the ATM Master Plan. However, such studies need to be undertaken.

For WG to elaborate on:

Have other airports in Indonesia declared a capacity value?

Which airports other than Jakarta and Surabaya are having capacity problems currently and which ones are expecting capacity problems in the short/medium and long term?

Comment from consultants: Only Jakarta airport has currently a capacity value or a runway throughput value. The value 54 aircraft/hour at Jakarta airport was reported by AP 2 staff. Surabaya Airport was reported already having capacity problems during peak hours. The issue will be considered in the ATM Master Plan and reflections will be based on previous Report ATM Analysis and Forecasts as well as the ASEAN Open Sky study.

2.11 GPI-15 MATCH INSTRUMENT METEOROLOGICAL CONDITIONS AND VISUAL METEOROLOGICAL CONDITIONS OPERATING CAPACITY

2.11.1Scope

Improve the ability of aircraft to manoeuvre on the aerodrome surface in adverse weather conditions.

Related Operational Concept Components: AO, CM, AUO

2.11.2Description of strategy

It should be an objective of the ATM system to utilise all airborne and service provision capabilities to maintain visual meteorological conditions (VMC) capacity to the greatest practical extent during instrument meteorological conditions (IMC). More use should be made of the capability of modern aircraft systems and ground systems in evolving toward this objective. Taxiway design and guidance capability may then be matched to those conditions.

Implementation of A-SMGCS, decision support tools and associated procedures offer the best solution for aircraft to operate in all weather conditions. At those locations where cost benefit analysis indicates a positive value, the improved guidance and control of taxiing aircraft and moving vehicles on the movement area as well as impending conflict alert may be fully automated.

Synthetic vision, based on a detailed aerodrome map, can enhance situational awareness under adverse weather conditions where runway/taxiway markings may be obscured. Head-up display and guidance systems that can synthesise enhanced vision sensor data and synthetic vision images can offer an integrated solution to enhance situational awareness.

Enhanced conflict detection and alerting technologies and procedures will improve the aerodrome surface movement throughput while meeting established levels of safety. Controllers should also have access to systems to help them develop and maintain situational awareness of all traffic on the movement area in all weather conditions.

2.11.3Current situation in Indonesia

Lack of A-SMGCS makes monitoring of large manoeuvring areas difficult during time of limited visibility and darkness. However, for airports where cost/benefit indicates a positive outcome such implementation should be considered. (Ref GPI 13) The manning of operational staff and working methods and coordination procedures in Aerodrome Control (ADC) must be adjusted during situations with limited visibility and reduced monitoring ability from the tower cab. For safety reasons a reduced capacity must be accepted by stakeholders and traffic congestions overcome by implementation of ATFM measures.

It is not known to the LFV Aviation Consulting team if such actions are taken or prepared for Indonesian airports, or if a special Low Visibility Procedure (LVP) is introduced.

In order to increase accessibility to airports situated in mountain areas during IMC conditions, introduction of curved approaches (RNP-AR) needs to be established in some cases. In Ambon- and Manado airports, such procedures are already planned to be introduced during this year (See also GPI-11). However, this should initially be used only for operational trials.

2.11.4Comments from stakeholders

Comments from CATT:

Discussion of VMC and IMC needs to cover all air operators, and the type of operations conducted throughout Indonesia.

For WG to elaborate on:

Are there many airports of vital interest for Indonesia that needs better landing aids (like Ambon and Manado) in order to maintain a good regularity during IMC conditions?

Comment from consultants:

This issue was not on the table during the meetings. However further elaboration will be undertaken and the issue will be part of the ATM Master Plan. These RNP-AR approaches could be an operational test bed for future approach concepts to airports situated in difficult terrain environment to accommodate more landings during IMC conditions.

CHAPTER 3: ATM MASTER PLAN OBJECTIVES

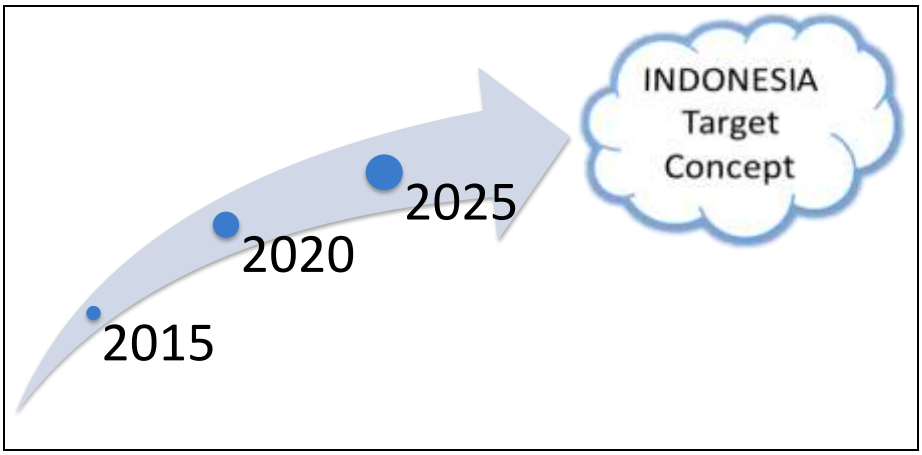
The ATM Master Plan for Indonesia will be a reference document for the development of the ATM over the next 15 years.

The document is based on and developed from the Master Plan issued in 1994 with considerations from the Japan International Cooperation Agency (JICA) study from 2002-2008 and the new law no. 1/2009 on aviation. The result from this WG will be an integrated part of the ATM Master Plan.

It will be composed of three stages;

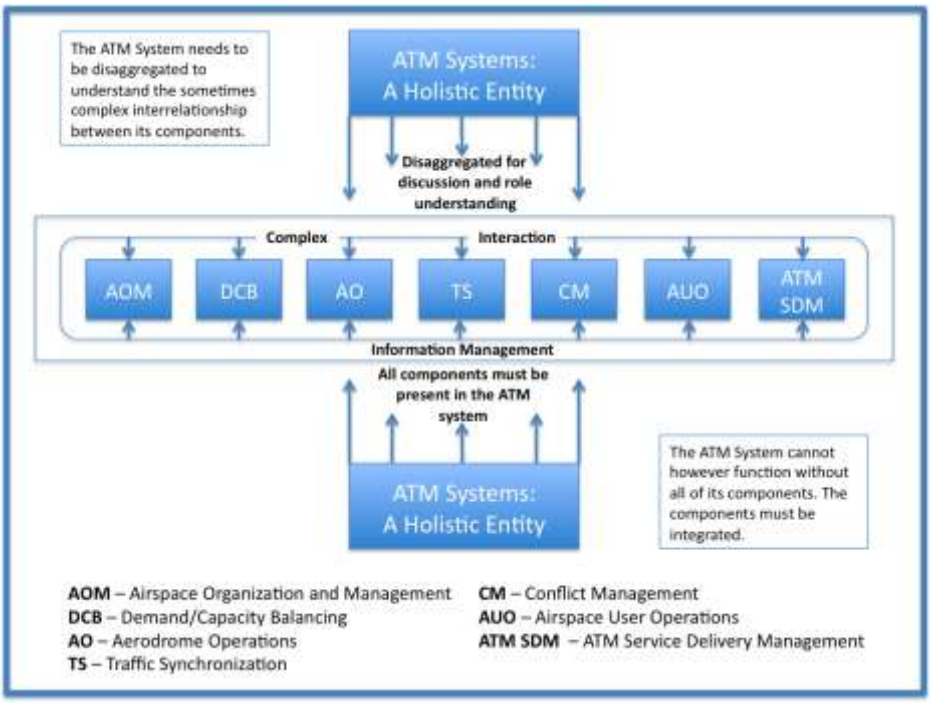
- Short term: up to 2015
- Medium term: from 2016 to 2020
- Long term: from 2021 to 2025 and beyond

Figure 1: The ATM Master Plan Milestones



In order to have a logical approach of the different programs, a number of operational objectives have been defined classified according to ICAO doc 9854 as seven key concept components depicted in the figure below.

Figure 2: ICAO concept components



For each of the key components the relevant high level tasks, which when achieved leads to the Operational ATM objectives, are defined.

The three programmes (short, medium and long term) have been defined by decomposing the high level tasks in several sub level tasks to be implemented timely to achieve the global high level objectives.

CHAPTER 4: AIRSPACE ORGANISATION AND MANAGEMENT

4.1 DESCRIPTION OF CONCEPT

Airspace organisation will establish airspace structures in order to accommodate the different types of air activity, volume of traffic, and differing levels of service. ASM is the process by which airspace options are selected and applied to meet the needs of the ATM community.

Key conceptual changes include:

- all airspace will be the concern of ATM and will be a usable resource;
- ASM will be dynamic and flexible;
- any restriction on the use of any particular volume of airspace will be considered transitory;
- all airspace will be managed flexibly. Airspace boundaries will be adjusted to particular traffic flows and should not be constrained by national or facility boundaries.

4.2 FUA - FLEXIBLE USE OF AIRSPACE (CIVIL/MILITARY COORDINATION)

The basis of the FUA concept

The basis for the FUA concept is that airspace should no longer be designated as either military or civil airspace but should be considered as one continuum and used flexibly on a day-to-day basis. Consequently, any necessary airspace segregation should be of a temporary nature only.

ICAO recommends that "in order to provide added airspace capacity and to improve efficiency and flexibility of aircraft operations, states should establish procedures providing for FUA reserved for military or other special activities. The procedures should permit all airspace users to have safe access to such reserved airspace".

4.2.1 Short term

In conclusion it should be possible to automatically transmit flight data for traffic crossing national borders. Operational, technical and political solutions are a prerequisite for a successful implementation of FUA. Civil/military cooperation will also:

- benefit military operations by a greater level of mission completion and increased operational flexibility through increased ATM integration.
- enable efficient use of training areas and improved ability to conduct military exercises.
- improve security coordination.
- improve safety for civil/military aviation.
- reduce environmental impact.

In summary it will increase flexibility for civil aviation use whilst maintaining control for the military.

- In order to use the airspace in an efficient way by civil and military users, enabled through the implementation of a FUA concept, an AMC should be established. This function will ensure there is a more effective sharing of airspace through joint civil/military strategic planning and pre-tactical airspace allocation. AMC should have civil and military competence and mandate.

AMC could be a function within Jakarta or Ujung Pandang ACC and manned by the selected centers operational supervisor or FMP-controller in cooperation with a military partner.

The application of the concept leads to:

- an increase of flight economy offered through a reduction in distance, time and fuel;
- the establishment of an enhanced ATS route network and associated sectorisation providing:
  - an increase in ATC capacity;
  - a reduction of emissions having a positive environmental impact.
- more efficient ways to separate operational and general air traffic;
- an enhanced real-time civil/military coordination;
- a reduction of ATC workload by simplified airspace structure;
- a reduction in airspace segregation needs;
- the definition and use of Temporary Segregated Areas (TSA) that are more closely in line with military operational requirements and more generally respond to specific military requirements in tactical phase.

4.2.2 Application of the FUA Concept

Effective application of a FUA concept requires the establishment of three levels of ASM in Indonesia:

Strategic Level – A national high-level airspace policy body tasked with the reassessment of national airspace, the progressive establishment of new flexible airspace structures, and the introduction of procedures for the allocation of these airspace structures on a day-to-day basis. It is also of vital importance to establish adequate real-time civil/military coordination facilities and procedures so as to fully exploit the FUA concept.

Pre-tactical Level - The practical application of the FUA concept relies on National AMCs for the daily allocation and promulgation of flexible airspace structures. The dissemination to aircraft operators of the daily availability of non-permanent ATS routes could be a task for a Regional Airspace Data Function or a Regional Flow Management Unit if and when established in the future.

Tactical Level - The real-time use of airspace allowing a safe separation between civil and military aircraft and activities are handled by the operational sectors.

Flexible airspace structures and procedures

Flexible airspace configuration will be designed to support changes in ATM services according to traffic flows, airspace restrictions and runway configuration at major regional airports. The FUA concept uses airspace structures that are particularly suited for temporary allocation and/or utilisation. The different airspace structures to be implemented in the short term are called:

- Conditional Routes (CDRs)
- Temporary Reserved Areas (TRAs)
- Temporary Segregated areas (TSAs)

4.2.3 Conditional routes

A CDR is a non-permanent ATS route or a portion thereof which can be flight planned and used only under certain specified conditions. CDRs permit the definition of more direct and alternative routes by complementing and linking to the existing permanent ATS route network.

CDRs are non-permanent parts of the AIP published ATS route network.

CDRs can be divided into different categories according to their estimated availability and flight planning possibilities. The authorities in Indonesia could, in a collaborative decision, evaluate if one or more categories of CDRs should be implemented in Jakarta and/or Ujung Pandang Area of Responsibility (AoR) and state the conditions and rules for their use.

Note: Airline operators flying to or over Europe are familiar with the following three categories of CDR:

- CDR 1: Available for Flight Planning.
- CDR 2: Closed during military exercise hours but can be available for Flight Planning even during mil time. Information is available at 1400 Coordinated Universal Time (UTC), the day before the flight.
- CDR 3: Not available for Flight Planning during mil exercise hours. Can be used tactical of ATC.

Where CDR is established and utilized, one or more of the following benefits exist:

- Better traffic distribution
- Increase in overall ATC capacity
- Flight economy
- Reduced emissions

4.2.4 Temporary Airspace Allocation (TAA) Process

Two different types of airspace reservation can be established taking into consideration the activity that would take place associated with the transit possibility and can be seen more generally as an "AMC-manageable" area:

- TRA is a defined volume of airspace normally under the jurisdiction of one aviation authority and temporarily reserved, by common agreement, for the specific use by another aviation authority and through which other traffic may be allowed to transit, under ATC clearance.
- TSA is a defined volume of airspace normally under the jurisdiction of one aviation authority and temporarily segregated, by common agreement, for the exclusive use by another aviation authority and through which other traffic will not be allowed to transit.

TRA or TSA are established in response to the need for civil, military, R&D, training, test flights or activities of a temporary nature which, due to the nature of their activities, need segregation to protect both them and non-participating traffic. TRA or TSA are established in accordance with national policy and allocated by AMCs for specific activities.

Recommendations: The FUA concept should be implemented. This could be done in a number of steps starting from the time of implementing the new or updated ATM system in Jakarta and Ujung Pandang ACC. The ATM system should support presentation on the “Air Situation Display” of active areas with a pre-notification time. The flight data system should at a later stage be able to handle rerouting and CDR’s. The Voice Communication System (VCS) must permit direct access between the operational coordination partners (civil and/or military).

Additionally we recommend that DGCA should take the initiative together with Indonesian Air Force to form an ATM High Strategic level body and to establish a

Project Team including the main stakeholders. One of the first items to deal with should be to investigate the impact of a FUA implementation on the existing legislation for the use of airspace in Indonesia.

4.3 MEDIUM TERM

Additional steps of FUA implementation could be taken.

The different airspace structures to be implemented in the medium term are called:

- Cross-Border Areas (CBAs)
- Prior Co-ordination Airspace (PCA)
- Reduced Co-ordination Airspace (RCA)

4.3.1 Cross-Border Areas

Cross border operations can be seen as a visionary goal. A CBA is an airspace reservation (TSA or TRA) established for specific operational requirements over international boundaries.

Political and military agreements between the States concerned are required prior to the establishment of CBAs. Formal agreements for the establishment and use of CBAs have to address issues of sovereignty, defence, legality, operations, the environment, and search and rescue.

4.4 LONG TERM

Refining the FUA concept.

4.5 FLEXIBLE ROLES/SECTORS

The amount of workload for the controller is highly dependent on the traffic situation in each sector. Traffic load fluctuates over a period of 24 hours and the amount of controller effort required to ensure safe operations is often hard to determine in advance. In order to cater for increasing or decreasing traffic situations and in order to enable good workforce planning a role based system is required. This implies that relevant roles can be allocated to a physical position.

Short term action

The new technical ATM system in Jakarta and an update of the Ujung Pandang system (Makassar Advanced Air Traffic Control System [MATSC]) should be designed with built-in flexibility and not constrain operational usage.

Sectorisation should be dynamically possible to change in order to reflect the service needed from the airspace users, military included. Sectors should be able to split and be merged with few notifications to adjacent units. Upper sectors may extend over large areas.

Staffing of an en-route sector should be possible with one executive and one planner controller. Operational procedures should be developed to use standardised clearances. Appropriate route structures should be adopted to enable system supported co-ordination and transfer of traffic. This will reduce operator workload.

ATS route network shall be reviewed and complemented by a number of PBN routes in order to accommodate the increased volume of domestic, international and transit traffic.

This work has been initiated by DGCA 2010 as a separate task force with consultancy support by JICA.

In complex terminal areas such as the Jakarta and Surabaya TMA, and some others, separated departure and arrival routes should be established. At crossing point, level windows should be defined to allow aircraft to fly as close as possible to an optimal profile.

A number of CDRs should be published and used whenever the military activity permits.

The introduction of CDM will allow all members of the ATM community to achieve an acceptable solution that takes into account the needs of those involved. All participants will therefore require a spirit of cooperation. A balance is required because CDM is primarily invoked to resolve competing demands for an ATM resource and to organise a safe sharing of that resource. The CDM concept should be in line with the principles of Airport CDM (A-CDM) in order to ensure that Indonesia can achieve a harmonised en-route to en-route concept and get valuable data from the domestic and international airports in Indonesia in order to feed the overall ATM network and airports with traffic and data.

4.5.1 Medium term

The planning function should allow extension to two or more sectors and with one Multi-Sector Planner (MSP). The evaluation of MSP should be considered after a period of operation in the new or updated system.

This could potentially lead to a reduction in staffing levels.

4.6 LONG TERM

To be decided.

CHAPTER 5: DEMAND/CAPACITY BALANCING

5.1 DESCRIPTION OF CONCEPT

Demand and capacity balancing (DCB) will strategically evaluate system-wide traffic flows and aerodrome capacities to allow airspace users to determine when, where and how they operate, while mitigating conflicting needs for airspace and aerodrome capacity. This collaborative process will allow for the efficient management of the air traffic flow through the use of information on system-wide air traffic flows, weather and assets.

Key conceptual changes include:

- Through CDS at the strategic stage, assets will be optimised in order to maximise throughput, thus providing a basis for predictable allocation and scheduling.
- Through CDS at the pre-tactical stage, when possible, adjustments will be made to assets, resource allocations, projected trajectories, airspace organisation, and allocation of entry/exit times for aerodromes and airspace volumes to mitigate any imbalance.
- At the tactical stage, actions will include dynamic adjustments to the organisation of airspace to balance capacity, dynamic changes to the entry/exit times for aerodromes and airspace volumes, and adjustments to the schedule by the users.

5.2 VIEWS ON IMPLEMENTATION OF ATFM IN INDONESIA

Jakarta and Ujung Pandang ACC should develop the FMP and combine the services with the civilian part of the AMC in order to communicate with adjacent centres and military counterparts if and when such entity is implemented. The FMP/AMC could also be involved in alleviating capacity problems experienced by other ACCs in the region.

Vision: A future DGCA initiative could be that together with ICAO and adjacent states to investigate the possibilities to expand the geographical area and to establish a future Regional Central Flow Management function for the benefit of the aviation in the region.

5.2.1 Responsibility

The responsibility of Jakarta and Ujung Pandang FMP respectively should include airspace and airports geographically located inside each AoR.

5.2.2 Authority and Objective

When ATFM measures are needed in Indonesian airspace, Jakarta and Ujung Pandang FMP should respectively be responsible for the assessment, coordination and the promulgation when such measures shall be implemented.

The overall objective is to optimise the traffic and to avoid congestion jeopardising the safety for air traffic. The predicted sector demand compared with the decided sector capacity should indicate whether or not traffic regulation is needed in order to avoid overload for ATC.

5.3 ATFM PHASES

ATFM consists of the following phases:

1. Strategic Phase - This comprises of strategic activities (research, planning and coordination) carried out more than two days before the day of operation. ATFM planning is carried out in conjunction with ATS units and military authorities.
2. Pre-tactical Phase - In this phase, planning and coordination activities are carried out during the two days before the day of operation. Pre-tactical planning involves examining the updated demand during the two days before the day of operation, comparing it with the ATC capacity expected to be available and where necessary either adjusting the strategic plan or deciding tactical measures to overcome cases of excess demand. In exceptional cases there could be a need to regulate the demand.
3. Tactical Phase - During this phase, ATFM activities are carried out on the day of operations. No matter how well strategic and pre-tactical planning is carried out, the actual ATC and traffic situations on the day are likely to differ from the forecast. Tactical ATFM activities are directed towards ensuring that:
    - Adequate measures are in place to resolve demand/capacity problems.
    - Measures imposed are the minimum required and unnecessary restrictions are lifted.
    - ATC resources are deployed to take account of the actual demand situation and make maximum use of available capacity.
    - Unavoidable delays are distributed as equally as possible.

5.3.1 Recommendations

Recommendation: In the new Jakarta Advanced Air Traffic Control System (JAATS) system a FMP/AMC work station should be planned. The tasks for the FMP could be extended further. DGCA could take the initiative to play a coordinating role in ATFM measures in the region for the benefit of all airspace users.

A new ATM system should support the presentation of expected sector demand derived from FPL information and/or other sources.

Short Term: Implement FMP at Jakarta and Ujung Pandang ACC.

Medium Term: Establish a common ATFM unit for Indonesia located at Jakarta or Ujung Pandang.

Long Term: Indonesia should support a Regional CFMU for the region.

5.3.2 ATFM Plan for Indonesia

5.4 SHORT TERM

5.4.1 Sector load prediction

The new system should be able to present predicted sector loads based on flight plan information and possibly other parameters. Ideally, the system support should be able to reflect not only on volumes of traffic but also expected complexity. Complexity factors could be expected conflicts, military activity or weather. The function would support planning of sectorisation and staffing at ATC centre and give benefits in efficiency and safety.

5.5 MEDIUM TERM

5.5.1 Sector and capacity definition criteria

Available capacity will vary due to several factors including uncontrollable events such as weather related turbulence or cumulonimbus (a special cloud formation) activity. In order to determine the number of sectors needed in an objective way, different criteria has been developed. These criteria can be used as far as practicable in the production of revised sectorisation proposals during the planned period. The criteria are based on the experience gained from previous sectorisation work. ATM tools, such as Medium Term Conflict Detection (MTCD) and ATS Inter-Facility Data Communications (AIDC) could also have a positive impact when creating or modifying sectors and determining capacity figures in the future.

A combination of inputs based on these different criteria could be used in a survey or planning for a revised sectorisation. The experience from existing sectorisation is also applicable, and/or results from a fast time simulation.

An important criteria from an efficiency point of view is that merge and split and reopening of sectors shall be facilitated, and cause a minimum of extra workload for the overtaking or reopening sector. System-capability for such actions has to be

considered including user friendly air-ground and ground-ground communication facilities. Closing/opening of sectors should not impact adjacent unit.

A number of merged sectors are also assumed to be used in the event of a contingency situation, and should therefore be an integrated part of normal operations outside peak hours.

Note: Of the 168 hours that comprise the week, the main operational part will be to operate in a different mode from the total sector capability. That is why the merge and split situation should be considered already in the sector planning phase.

It can be anticipated that after a period of operational experience from the benefits of using new equipment and silent co-ordination methods, to a greater extent than today, a revised and more flexible criteria for sector and capacity definition could be expected.

Capacity figures for the sectors in the new ATM system should be based on experience and assumptions taking into account reduced workload due to automatic coordination, good presentation, sufficient VCS and planning tools. A simplified airspace structure and availability of airspace, as a result of FUA, will also have a positive effect on future capacity. When developing the future sector capacity figures, capacity for merged sectors should be determined as well.

Recommendation: Having the implementation of the new JAATS in mind, Indonesian ANSP should perform a survey of future sectorisation and where possible/desirable make a resectorisation prior to the planned commissioning in 2013.

In order to receive documentation and objective results of different solutions including horizontal division of the airspace, a fast time simulation is recommended. Additional objective for fast time simulation could be to investigate different possibilities to merge sectors temporary in order to gain in staff efficiency.

.

5.6 LONG TERM

5.6.1 Sector and capacity definition criteria

To be decided.

CHAPTER 6: AERODROME OPERATION

6.1 DESCRIPTION OF CONCEPT

As an integral part of the ATM system, the aerodrome operator must provide the needed ground infrastructure including, inter alia, lighting, taxiways, runways, including exits, and precise surface guidance to improve safety and maximise aerodrome capacity in all weather conditions. The ATM system will enable the efficient use of the capacity of the aerodrome airside infrastructure.

Key conceptual changes include:

- Runway occupancy time will be reduced
- The capability will exist to safely manoeuvre in all weather conditions while maintaining capacity
- Precise surface guidance to and from a runway will be required in all conditions
- The position (to an appropriate level of accuracy) and intent of all vehicles and aircraft operating on the movement area will be known and available to the appropriate ATM community members.

AO describes the aerodrome functionality within the ATM system in terms of such factors as information acquisition and delivery, facility access, demand on airspace, and limits on usability.

AO will be considered from an en-route to en-route perspective in determining their role within the ATM system.

The principal challenge to aerodrome operators will be to provide sufficient aerodrome capacity, while the challenge to the ATM system will be to ensure that all available capacity is fully and efficiently utilised in a timely manner. AMAN can provide arrival traffic that considered local constraints at the destination airport. However, more importantly coordination between Tower, APP and ACC is required in order to create efficient traffic flows.

Where required, runway geometry will permit runway entry and exit at any location along its length, minimising runway occupancy time and reducing holding areas.

Precise surface guidance to and from a runway will be preferred in all conditions. The position of all vehicles and aircraft operating on the movement area will be known and available to the appropriate ATM community members.

(Not covered in this ATM Master Plan.)

Environmental issues such as noise, gaseous emissions and visual intrusions will be considered in the design, development and operation of aerodromes. Restrictions on airside operations may occur due to environmental constraints and public concern.

Flight parameters will be available to the ATM system, allowing for dynamic spacing and sequencing of departing aircraft, thereby minimising wake vortex constraints on runway capacity.

Recommendation: In order to lead to a smooth flow of air traffic and in order to optimise capacity and safety into and out of airports, in an efficient and environmental good manner, it is recommended to work in a collaborative way involving Indonesian ANSP and Airport Operators (Authorities). The objective should be to link TS activities together with AO activities.

6.2 SHORT TERM ACTIONS FOR INDONESIAN AIRPORT OPERATIONS

Assure that dedicated ATC ground positions are available to increase overall airport ATC capacity.

Assure that all users of the airport areas have the proper safety training concerning regulations for entry/exit to/from vital airport areas (runway/taxiway/apron).

Assure that security at airports is sufficient in order to prevent unauthorised trespassing.

6.3 MEDIUM TERM ACTIONS FOR INDONESIAN AIRPORT OPERATIONS

Increase surveillance capacity

6.4 LONG TERM ACTIONS FOR INDONESIAN AIRPORT OPERATIONS

Provide for more environmental friendly air traffic handling at and in the vicinity of the airports.

CHAPTER 7: TRAFFIC SYNCHRONICATION

7.1 DESCRIPTION OF CONCEPT

TS refers to the tactical establishment and maintenance of a safe, orderly and efficient flow of air traffic. TS, CM and DCB are interrelated and will become fully integrated, leading to a continuous and organised flow of traffic.

TS encompasses both the ground and airborne part of ATM and will constitute a flexible mechanism for capacity management by allowing reductions in traffic density and adjustments to capacity in response to variations in demand.

TS will make use of integrated and automated assistance to arrival and en-route management (AMAN) to ensure an optimum traffic flow. The objective will be to eliminate choke points and, ultimately, to optimise traffic sequencing to achieve maximisation of runway throughput.

TS, together with the other ATM components, will contribute to the efficient handling of traffic. There will be dynamic 4-D trajectory control and negotiated conflict-free trajectories. These techniques will reduce the need for traditional path stretching in high traffic density areas and will reduce the adverse impact this has on economy and efficiency.

TS will be applicable and tailored to all airspace and aerodromes where the optimised ordering and sequencing of traffic are critical to accommodate demand.

TS principles include the following:

- the ability to tactically and collaboratively modify sequences to optimise AO, including gate management and/or AUO;
- evolution into 4-D control where a flight is given a time profile to follow to optimise throughput; and
- delegation of maintenance of spacing to the flight deck to increase traffic throughput while reducing ground system workload.

The activity above should be seen as visionary and therefore considered in the long term.

7.2 DEVELOPMENT AND IMPLEMENTATION

A well-organised Arrival Management is important for efficient operations. This is becoming increasingly important with the development of fuel prices and also due to increased environmental awareness. For Soekarno-Hatta Airport an efficient flow of

traffic is important for the Airspace users and for the Airport. The Airport will have more predictable arrival times, an important element for gate planning.

Arrival Management should not only meet the demand from ATC to sequence traffic, but also help to facilitate more efficient descent operations. The goal should be to gradually offer continuous descent operations (CDA).

7.2.1 Short term

The information from the arrival management tool (AMAN) should be integrated with the normal display system to provide efficient advisories for the controllers in relevant ACC and APP sectors for traffic to Soekarno-Hatta Airport (Normally ACC sectors adjacent to APP-sectors).

7.2.2 Medium term

Depending on expected traffic development, AMAN should be considered also for the airports in Surabaya, Bali, Medan and Makassar.

7.2.3 Long term

See introduction text to TS above.

A future concept of issuing ATC slots for arriving traffic with a very narrow window of e.g. plus/minus 2-3 minutes.

CHAPTER 8: CONFLICT MANAGEMENT

8.1 DESCRIPTION OF CONCEPT

CM consists of three layers:

- Strategic
- Separation provision
- Collision avoidance

8.2 STRATEGIC

The strategic CM consists of organising and managing airspace to reduce conflicts in traffic flows to the extent possible. The capacity of the ATM system should be organised to meet the expected traffic demand. In the rare instances when this is not possible restrictions should be published, to avoid overload of the ATM system. TS, being one component of CM, aims at organising and optimising traffic to avoid bunching. The overall aim of the strategic CM is to reduce tactical conflicts and indirectly unlock controller workload.

8.3 SEPARATION PROVISION

The second layer of CM is separation provision. It is used to detect deficiencies in the strategic planning and where the evolving tactical events have not been possible to plan conflict free. There are four possible stages of a separation provision:

- Conflict detection
- Solution selection[1]
- Implementation
- Monitoring

The ATC system should include support for these stages. MTCD provides a means for system identified conflicts. The MTCD function provides additional support to the planning function in the detection and analysis of conflicts. The function is highly dependent on accuracy of data, trajectory predictions and conflict parameters. Experience from past implementations indicates an acceptable degree of usability during stable flight conditions. In a dynamic environment, e.g. TMA operations, the

[1] The controller will not necessarily select and implement a measure for all conflicts. It is also possible it will just be monitored. If it does not deteriorate action it may not be necessary.

function is expected to improve in the future from a usability perspective. MTCD should also check for segregated airspace and provide an improved means to tactical flight planning and for re-routing.

The aim of MTCD is to facilitate a move from the current largely reactive form of ATC to a more pro-active control, thereby balancing more evenly the workload of tactical and planning tasks, enhancing sector team efficiency, and providing an even safer and better service to airspace users. By maximising the opportunity of pro-actively solving problems during sector planning, it is hoped that tactical workload can be reduced.

8.4 COLLISION AVOIDANCE

The third layer of CM is collision avoidance. The ground system shall have a Short Term Conflict Alert (STCA) to inform the controller of the immanent risk of separation infringement.

A STCA is a safety net to warn the controller of any situation where the minimum separation distances between any pair of surveillance tracks is violated, or is predicted to be violated within a short time (usually 2 minutes). By providing a visual alert on the Air Situation Display the controller can retrieve the alerts in a timely manner to resolve the potential hazardous situation that has occurred. Potentially the system should also support audible alerting.

Note: STCA is mandatory in Europe, and EUROCONTROL have recommended the following principles to be placed at the centre of policy making for use of STCA:

- STCA is a safety net; its sole purpose is to enhance safety and its presence is ignored when calculating sector capacity.
- STCA is designed, configured and used to make a significant positive contribution to the effectiveness of separation provision and collision avoidance.

STCA should not be used as a separation tool, an important issue for training.

See WP for WG 2 ATC for more information.

CHAPTER 9: AIRSPACE USER OPERATION

9.1 DESCRIPTION OF CONCEPT

AUO refer to the ATM-related aspect of flight operations.

Key conceptual changes include:

- the accommodation of mixed capabilities and worldwide implementation needs will be addressed to enhance safety and efficiency;
- relevant ATM data will be fused for an airspace user's general, tactical and strategic situational awareness and conflict management;
- relevant airspace user operational information will be made available to the ATM system;
- individual aircraft performance, flight conditions, and available ATM resources will allow dynamically-optimised 4-D trajectory planning;
- CDM will ensure that aircraft and airspace user system design impacts on ATM are taken into account in a timely manner; and
- aircraft should be designed with the ATM system as a key consideration.

The ATM system shall accommodate different types of services for diverse user needs. Air transport, military missions, business, private flights and aerial work all have different requirements and planning horizons. The system needs information from the airspace users to be efficient and ATM data is also needed for the users, to maintain situation awareness.

Individual aircraft performance parameters are important for the optimisation of the 4-D trajectory management. In transition to the target ATM concept of 2025 there will be an increased importance of providing user preferred trajectories. Business oriented operations with a growing demand for economical gains is driving expectations for a more clear ownership of the predicted trajectory from the airspace users. This will require support for planning and execution of user preferred trajectories and most importantly predictable operations.

9.2 SHORT TERM

Let the airspace users be part of the Airport CDM

9.3 MEDIUM TERM

Develop the airport CDM from airspace user perspective.

9.4 LONG TERM

Consider implementation pending the result of the global development.

CHAPTER 10: ATM SERVICE DELIVERY MANAGEMENT

10.1 DESCRIPTION OF CONCEPT

ATM service delivery management (SDM) will operate seamlessly from gate to gate for all phases of flights and across all service providers. The ATM SDM component will address the balance and consolidation of the decisions of the various other processes/services, as well as the time horizon at which, and the conditions under which, these decisions are made. Flight trajectories, intent and agreements will be important components to delivering a balance of decisions.

Key conceptual changes include:

- Services to be delivered by the ATM SDM component will be established on an as-required basis subject to ATM system design. Once established, they will be provided on an on-request basis;
- ATM system design will be determined by CDM and system-wide safety and business cases;
- services delivered by the ATM SDM component will, through CDM, balance and optimise user-requested trajectories to achieve the ATM community's expectations; and
- management by trajectory will involve the development of an agreement that extends through all the physical phases of the flight.

10.2 SHORT TERM

See WP for WG 2 and 3 for more

10.3 MEDIUM TERM

See WP for WG 2 and 3 for more

10.4 LONG TERM

See WP for WG 2 and 3 for more

CHAPTER 11: TENTATIVE IMPLEMENTATION SCHEDULE

11.1 SHORT TERM ATFM

1. Regulate traffic at Jakarta Soekarno Hatta Airport by CDM between ATC/Airport/Airspace Users.
2. Determine maximum sector capacities in ACC/APP sectors in Jakarta and Ujung Pandang ACC.
3. Implement tools to provide forecasted demand in order to balance forecasted demand versus available ATC Capacity.
4. Establish a Task Force concerning missing FPLs and regulations concerning submission time of FPLs (see also WP4).
5. Establish a FMP in Jakarta and Ujung Pandang ACC.

11.2 MEDIUM TERM ATFM

1. Establish a national Flow management Unit (FMU) in Jakarta or Ujung Pandang ACC- maintain the FMPs at both ACCs

11.3 LONG TERM ATFM

1. Indonesia to be part of a centralised demand and capacity concept in the southeast Asian region. Tools to be developed.

11.4 SHORT TERM ASM

1. Implement the FUA concept.

   Activities:

   A. Implement High Level meetings of DGCA and Military Counterparts.

   B. Introduce an AMC function in each ACC co-located with the FMP function for pretactical airspace allocations.

   C. Establish direct speech facilities between ATC and Mil counterparts for tactical coordinations.

   D. Review airspace classes with regard to forecasted traffic growth.

      i.e. the division level between controlled and not controlled level relevant in the future.

Based on future required operational concept concerning separation standards for the future traffic demand:

2. Review SID/STAR requirements for major airports and make necessary new procedures based on PBN as a compliment that can cater to CDA approaches

3. Establish PBN routes according to user requirements as a compliment to conventional ATS routes.

4. Establish in the FUA concept CDRs if feasible.

5. Establish a process to review the requirement of future routes and cancel old not utilised. (See ITSAP report).

11.5 MEDIUM TERM ASM

1. Implement PBN according to ICAO Regional Plans.

2. Implement RNP-AR approaches at required airports where terrain obstacles provides high minima on operational test trials.

3. Continue to develop the FUA concept.

4. Develop concept for user preferred routes (RNAV/RNP).

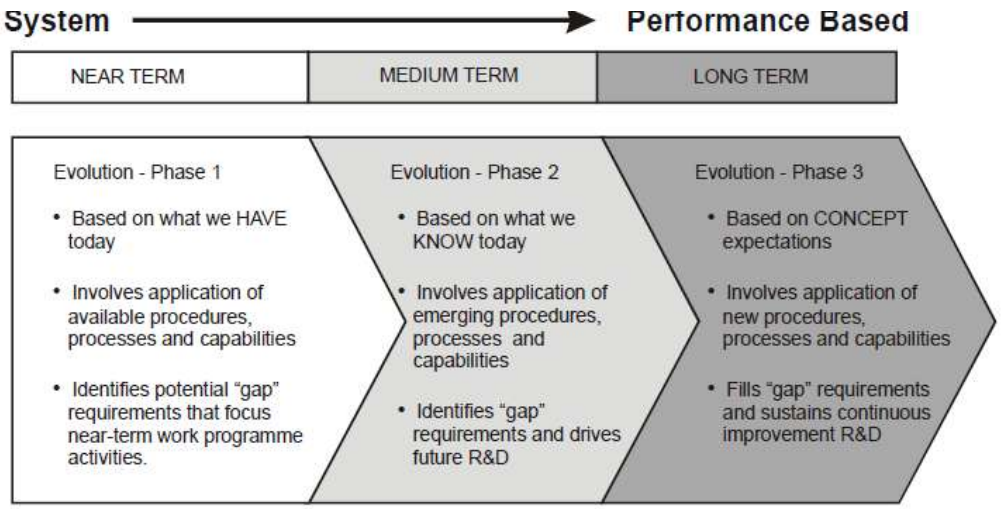
5. Continue to develop PBN routes/SID/STARS according to user requirement and ICAO Regional Plans.

6. Establish a task force to review delegation of ATS to other states to be compliant with Aviation Law no. 1.

11.6 LONG TERM ASM

1. Provide for transition of ASM into AOM according to ICAO Global ATM Operational Concept

CHAPTER 12: VISION ACCORDING TO ICAO



12.1 AERODROME OPERATIONS (AO)

AO describe the aerodrome functionality within the ATM system in terms of factors such as information acquisition and delivery, facility access, demand on airspace, and limits on usability. There will be a dependency on landside operations where improvements will be needed to optimise aerodrome capacity.

AO will be considered from an en-route to en-route perspective in determining their role within the ATM system.

AO principles include the following:

a) runway occupancy time will be reduced;

b) the capability will exist to safely maneuver in all weather conditions while maintaining capacity; and

c) any activities that takes place on the maneuvering area or apron will be considered as having a direct influence on ATM.

Where required, runway geometry will permit runway entry and exit at any location along its length, minimising runway occupancy time and reducing holding areas.

Precise surface guidance to and from a runway will be required in all conditions. The position (to an appropriate level of accuracy) and intent of all vehicles and aircraft operating on the movement area will be known and available to the appropriate ATM community members.

Landside activities not directly related to the ATM system will have an impact on AO. These activities include, inter alia, customs, security, baggage handling and fuel supply, and will be optimised through the collaborative exchange of information.

Environmental issues such as noise, gaseous emissions and visual intrusions will be considered in the design, development and operation of aerodromes. Restrictions on airside operations may occur due to environmental constraints and public concern.

Flight parameters will be available to the ATM system, allowing for dynamic spacing and sequencing of departing aircraft, thereby minimising wake vortex constraints on runway capacity.

LFV Aviation Consulting Remark

The five major airports in Indonesia have, after special capacity studies, increased runway throughput (reduced occupancy time) by increasing entry and exit locations and improved surface guidance to and from the runways. Jakarta Soekarno Hatta Airport as well as Medan, Makassar, Bali and Surabaya airports have increased their surface surveillance in order to keep up capacity during bad weather conditions. At Jakarta's Airport independent arrivals/landings to both the parallel runways have been normal procedures for many years. Standardised procedures for separating traffic departing from one (departure) runway from traffic landing on the other (arrival) runway are in operations. A third runway is under construction.

Five major airports in Indonesia are categorised as Eco-airports or Green-airports and more are in the process of being certified according to those specified environmental criteria. One of them is a standardised procedure for CDA used frequently. A DMAN at those airports reduces the taxi times and therefore also noise level, gaseous emissions and results in less fuel burn.

A recruitment and training process for ADC ATC Controllers and Aeronautical Flight Information Services (AFIS) staff have been going on for many years and the vacancy level is quite low. In Jakarta TWR staff is available to man positions for both runways"

12.2 DEMAND AND CAPACITY BALANCING

The function of DCB will be to minimise the effects of ATM system constraints. DCB will be capable of evaluating system-wide traffic flows and capacities in order to implement necessary actions in a timely manner.

DCB will allow airspace users to optimise their participation in the ATM system while mitigating conflicting needs for airspace and aerodrome capacity.

Collaborative usage of decision-support tools will ensure the most efficient use of airspace resources, provide the greatest possible access to airspace resources, provide equitable access for all airspace users, accommodate user preferences and ensure that demand on an airspace resource will not exceed its capacity.

DCB will be integrated within the ATM system. DCB will be undertaken at the strategic, pre-tactical and tactical stages.

DCB principles include the following:

a) the difference between user-requested trajectories and actual trajectories will be optimised by the system to be as small as possible for individual flights;

b) recognition of deficiencies and optimisation of assets will ensure maximum capacity through the balancing of operations against available assets;

c) balancing techniques will generally be based on system predictability; however, systems must be able to accommodate unplanned situations;

d) the balancing of demand and capacity will be performed from gate to gate;

e) system-wide balancing techniques will also be used to resolve local DCB problems;

f) strategic initiatives will require tactical flexibility to provide optimal airspace availability; and

g) DCB will take into account information about current and predicted airspace conditions, projected demand as well as past performance. Tools to strategically identify areas and times of higher density will also be available.

LFV Aviation Consulting remark

Indonesian ATFM has been developed during the last 10 years, now being a part of a centralised FMU. DCB is made on a strategic, pre-tactical and tactical stage for the whole southeastern Asia using all airspace according to the AOM concept.

All sectors (airspace volumes) have declared their capacity values, which may differ during each 24 hour period depending on usage of airspace from military units, weather conditions etc. All traffic movements from gate-to-gate (G2G) are part in this assessment concerning available capacity versus the demand. Technical support tools have been developed for this mission so that the airspace can be used equitable for all users at an optimum level. Traffic can, to a large extent, fly their user preferred trajectories and be provided different alternatives in a tactical and flexible way.

12.3 AIRSPACE ORGANISATION AND MANAGEMENT

All airspace will be the concern of ATM and will be a usable resource. The organisation, flexible allocation and use of airspace will be based on the principles of access and

equity. On this basis, any restriction on the use of any particular volume of airspace will be considered transitory. The airspace will be organised and managed in a manner that will accommodate all current and potential new uses of airspace.

While acknowledging sovereignty, airspace will be organised globally. Airspace will be organised to accommodate the needs of the different types of users on a timely basis. Transition between areas will be transparent to users at all times.

ASM will be dynamic, flexible and based on services demanded.

Airspace organisational boundaries, divisions and categories will be adapted to traffic patterns and changing situations and will support the efficient operation of the other ATM services described among the seven concepts.

Airspace will be organised to facilitate the seamless handling of flights and the ability to conduct flights along optimum flight trajectories from gate to gate without undue restriction or delay.

Airspace planning will be based on accommodating dynamic flight trajectories whenever practicable. Structured route systems will be established only in areas where the demand for dynamic trajectories cannot be accommodated.

Airspace organisation will be based on the principle that all airspace is managed, and all related activity within the airspace will be known to the ATM system in varying degrees. “Managed” means that a strategic or tactical decision as to the level of service to be provided will have been taken by the appropriate authority.

Although there will generally be no permanent/fixed constrained airspace, certain airspace will be subjected to service limitations, including access over an extended period, motivated by national interests or safety issues and appropriately considered in coordination with the ATM community.

LFV Aviation Consulting remark

All Indonesian airspace as well as the airspace in the neighboring region is organised in a flexible and dynamic way, meaning that the airspace will be allocated on a timely basis to different kind of users such as military missions, civilian aircraft operators etc. Any restriction on the use of the airspace volume will only be on a temporary basis. Airspace will be able to accommodate dynamic 4D user preferred trajectories from e.g. Makassar to Jakarta. Fixed PBN (RNAV/RNP) routes will be published to be used when the user preferred trajectories cannot be accommodated due to military usage of airspace. Route structure is no longer based on conventional ground based navigation.

Airspace management

ASM is the process by which airspace organisation options and other options in the provision of services will be selected and applied to best meet the needs of airspace users.

Competing interests for the use of airspace will make ASM a highly complex exercise, necessitating a process that equitably balances those interests.

a) Traffic flows and should not be constrained by national or facility boundaries;

b) ASM processes will accommodate dynamic flight trajectories and provide optimum system solutions;

c) When conditions require that different types of traffic be segregated by airspace organisation, the size, shape and time regulation of that airspace will be set to minimise the impact on operations;

d) Airspace use will be coordinated and monitored in order to accommodate the conflicting legitimate requirements of all users and to minimise any constraints on operations;

e) Airspace reservations will be planned in advance with changes made dynamically whenever possible. The system will also accommodate unplanned requirements;

f) Structured route systems will be applied only where required to enhance capacity or to avoid areas where access has been limited or where hazardous conditions exist;

g) Uniform airspace organisation and management principles will be applicable to all regions. Global principles will be applicable at all levels of density and will affect total traffic volume. Complex operations may limit the degree of flexibility; and

h) Areas that should strive for the earliest and shortest implementation are those where ATM community expectations are not being met.

LFV Aviation Consulting remark

The Airspace in Indonesia will be managed by the new ANSP and be regulated by DGCA. A special airspace process has been established with the objective to balance the needs of the different airspace users. An Airspace Management cell manages the pre-tactical airspace allocation needs while a high level body of representatives from DGCA and Military Authority sets the strategic framework for a joint airspace cooperation work. Day-to-day tactical coordination's are exchanged between civilian ATCs and Military Fighter Controllers. The same ASM has been implemented in Southeast Asia. Air Traffic can fly the most user preferred trajectories during most hours and when not able, structured PBN routes will temporarily be used.

REFERENCES

Law no. 1/2009 on Aviation

Master Plan and Feasibility Studies in the Area of Air Traffic Control - By Sofréavia 1994

SMEC Sub-Consultancy Agreement

ICAO Doc 9750 - Global Air Navigation Plan

ICAO Doc 9613 - Performance Based Navigation (PNB)

ICAO Doc 9854 - Global Air Traffic Management Operational Concept

Indonesian AIP

The feasibility study for the strategic implementation of CNS/ATM systems in the republic of Indonesia - By JICA 2008

ICAO Global Operational Data Link Document Edition 1 - 14 June 2010

ICAO APAC Regional Report 2008

National Strategy for the Implementation of ASEAN Open Sky Policy – May 2010

Report on Traffic Analysis – LFV Aviation Consulting July 2010

APAC Regional performance-based navigation implementation plan –September 2009

The Master Plan Study on the Strategic Policy for the Air Transport Sector in the Republic of Indonesia 2004 (JICA)

Strategic Plan of The Ministry of Transportation year 2010 – 2014

Airspace and Air Route Review- July 2010

ANNEXES

ANNEX 1: WORKING GROUP 1 ATFM/ASM

WG ATFM/ASM was established with focus areas on ATFM and ASM issues.

Linked GPIs according to ICAO´s Global Air Navigation Plan, Doc 9750 are GPIs no. 1, 2, 3,4,6,7,8,10

The WP shall elaborate on the following work areas:

- Declaration of sector capacities for EnRoute/TMA sectors and major airports in Indonesia
- Integration of a FMP (function) in Jakarta/Ujung Pandang ACC
- Present and future sector design for enroute/TMA in Indonesia
- Present and future ATS route design
- Short term budget
- Other relevant issues

The working group will be managed by Peder Albèr, the LFV Aviation Consulting team Participants according to annex 2

Kick-off Meeting

A kick-off meeting was held on 18 Aug 2010 at the DGCA premises. The members of the WG were tasked with the following assignments:

1. Make a list of items to be considered and included in the update of the ATM Master Plan in the respective short, medium and long term.
2. To try and make a priority of proposed activities within the respected time period.

   The team results should be presented in a WP, answering the questions in the ToR above.

Following issues were on the table:

- When is there a need for AMC to plan on a pre-tactical level the most efficient allocation of airspace based on capacity?
- Where should such national entity be located according to the team?

Issues for the WG to consider on the following meetings

During the implementation period of new items, it must be stated that the existing essential and important service level must remain or even be improved. Before any decision is taken a budget consideration must take place.

- Comments on the statements extracted from the report on Indonesian ATM planning review.
- Comment on questions/statements in boxes in the different chapters ahead.

Following are some examples of Activities to be included in the Master Plan proposed already during the "Kick off" meeting:

1. Introduce as a first step of ATFM the establishment of a FMP at Jakarta and Ujung Pandang ACC/APP. This is a necessary action in order to protect operational staff from overload. This action will also create environmental benefits as well as cost reductions for airspace users.
2. Regulate traffic at peak hours at Jakarta Soekarno Hatta airport after coordination with Airport and Airlines (CDM) in order to facilitate for a more efficient and cost-effective operation. Also airport environment will benefit from this action.
3. Realistic traffic capacity figures for sectors to be declared in Jakarta and Ujung Pandang ACC should be assessed as a prerequisite for further ATFM measures.
4. Add an ATS route between Jakarta and Bali separated from the route Jakarta-Surabaya. In a first step it could be as a CDR to be used only when there is no military need for that airspace.
5. There is a need to implement an increased segregated one-way route structure at congested routes in order to gain capacity and environmental benefits when facilitating for continuous climb and descent for both domestic and international traffic (Reference Airspace and Air Route Review).
6. Establish procedures on "How to review ATS routes" followed by Review of airspace structures in the short term and medium term.
7. Find out RNAV/RNP separation minima to be used in the area.
8. Activity to reduce the high number of missed FPL or Air Filed (AFIL).

More to be added by the WG, based on their own experience and expectations.

See Minutes from Kick-off meeting WG 1 in Annex 3

ANNEX 2 PARTICIPANTS IN KICK-OFF MEETING

There is a need to implement an increased segregated one-way route structure at congested routes in order to gain capacity and environmental benefits when facilitating for continuous climb and descent for both domestic and international traffic (Reference Airspace and Air Route Review).

Activity number and title	: 180, Air Navigation Blue Print
Title of meeting	: Working Group 1 Kick Off Meeting
Date and place	: 18 August 2010; Meeting Room of Air Navigation Directorate
Moderator	: Wisnu Darjono TU

No	Name	Position	Agency
1	Batara Nainggolan	Deputy GM of ATS Operation	PT. AP 2 (PERSERO)
2	Masrian	KTS QA Manager - AP II Headquarter	PT. AP 2 (PERSERO)
3	Ulul Azmi	Flight Procedure Designer	DGCA
4	Andri	Flight Procedure Designer	DGCA
5	Bayu Sekti Aji	Staff Directorate of Air Navigation	DGCA
6	Alit Sodikin	Safety Management System Manager	PT. AP 2 (PERSERO)
7	Kristianto	Radar Supervisor	PT. AP 2 (PERSERO)
8	Zainal Arifin Harahap	ATM Division Staff	DGCA
9	Desi Rahayuningsih	Staff	DGCA
10	Ahmad Nurdin Aulia	Certification and Standardization	DGCA
11	Riza Fahmi	Assistant Deputy Director	PT. AP 1 (PERSERO)
12	Emil Ardiaman	PAU Staff	IndII
13	Maria Renny	Junior Transport	IndII
14	Lars-Gunnar Adolfsson	ATM Expert	LFV
15	Bert-Ake Wahlgren	Project Manager	LFV
16	Arlini Dewi Hadiyanti	Secretary	IndII

Activity number and title : 180, Air Navigation Blue Print

Title of meeting : Working Group 1 Meeting 1

Date and place : 23 September 2010; Meeting Room of Air Navigation Directorate

Moderator

No	Name	Position	Agency
1	Masrian	KTS QA Manager - AP II Headquarter	PT. AP 2 (PERSERO)
2	Alit Sodikin	Safety Management System Manager	PT. AP 2 (PERSERO)
3	Kristianto	Radar Supervisor	PT. AP 2 (PERSERO)
4	Zainal Arifin Harahap	ATM Division Staff	DGCA
5	Emil Ardiaman	PAU Staff	IndII
6	Colin Tuckerman	advisor	CATT
7	Novaro M	ATC Advisor	CATT
8	Erick AR	ATS SMS	APT AP II

Activity number and title : 180, Air Navigation Blue Print

Title of meeting : Working Group 1 Meeting 2

Date and place : 27 September 2010; Meeting Room of Air Navigation Directorate

Moderator

No	Name	Position	Agency
1	Batara Nainggolan	Deputy GM of ATS Operation	PT. AP 2 (PERSERO)
2	Wahyu Tirtaji		
3	Kristianto	Radar Supervisor	PT. AP 2 (PERSERO)
4	Zainal Arifin Harahap	ATM Division Staff	DGCA
5	Emil Ardiaman	PAU Staff	IndII
6	David Ramsay		ITSAP
7	Novaro M	ATC Advisor	CATT
8	Erick AR	ATS SMS	APT AP II
9	Katrin Hewitt		ASA
10	Akhmad Zaenuri	Staf DD Ops LLP	PT AP I

ANNEX 3: MINUTES FROM KICK-OFF MEETING:

Location: DGCA Meeting Room, 23rd Floor

18 August 2010

Briefing points:

1. Mr. Lars explained about the purpose of the master plan and WG activities in general. Master plan aims to provide road map, list and schedule that must be followed in order to have an updated ATM in Indonesia in the short, medium, and long term. The WG activity is to collect input from Indonesian operators and stakeholders and rely on their experiences, thoughts, and hopes. WG will produce working papers that will be input for the ATM master plan.
2. Pak Wisnu adds that the Master Plan will be designed for 15 years from now. Consultant will solve existing, midterm, and long term Indonesia air traffic problems. WG participants are expected to think "out of the box" and not stick to the current conditions or existing plan.

Input from participants:

1. AP1 wants the consultant to first explain the future development of ATM technology and provide clues on the things that will change the world of aviation in the future.
2. Pak Wisnu suggested that the subject of discussion refers to 1994 ATC Master Plan, 2002 DGCA revised, and the JICA study in 2007. However, forum finally agreed that the discussion will be based on ICAO GPI topic which has been prepared by consultant.
3. Associated with a GPI-1, the consultant suggested that Indonesia has to implement FUA between the military and civilian, as already mandated in Law no. 1/2009 and ICAO. This would be difficult to realise in a short time and must begin with a discussion at high levels. The consultant has had a similar experience in Thailand. Forum pessimistic about this, but agreed that this issue should be included in the master plan.
4. Forum asked realistic time and strategy regarding how delegated ATS to Singapore and Australia should be transferred to Indonesia within 15 years and how the ATM Master Plan will include this issue.
5. AP2 recommended a restructuring of ATS route in the master plan. This is based on the ITSAP report where many routes that have not been used, otherwise there are a lot of high traffic routes that have not been established by DGCA. DGCA needs the procedure/SOP to establish a new ATS route.
6. In connection with GPI-2, DGCA declared that RVSM has been implemented in Indonesia. Consultant questioned the procedure for "suspension of RVSM", and AP1 and AP2 said that they already have such procedures.

7. For the next GPIs discussion, there are no significant comments from the WG participants. But note from discussion, there are some flights (including international flights) which give no flight plan to ATC (e.g., AirAsia from Malaysia). This problem also occurs in flights from small airport. This has become a serious concern for the consultant.

Next Step:

1. WG participants will give comments from ATFM/ASM materials which are provided by consultant.
2. Comments and any information from participants will be collected through the coordinator of WG (Pak Zainal Arifin Harahap) via email.
3. The next meeting will be held on September 21st with agenda being the discussion of incoming comments.

ANNEX 4: WP FROM AP2 CONCERNING ATFM/ASM

PT Angkasa Pura II (Persero)

WORKING PAPER

ATFM/ASM WORKING GROUP DISCUSSION

ATFM/ASM IN JAKARTA FIR

(Presented by PT Angkasa Pura II)

EXECUTIVE SUMMARY

This working paper overview the increasing of air traffic demands relating to handling capacity, airspace restructure, sector capacity and the need of air traffic flow management within Jakarta FIR and its integration with Ujung Pandang ACC relating with air traffic growth, demands and handling capacity of Jakarta FIR.

1 INTRODUCTION

1.1 Jakarta FIR was a 'main bridge' which connected the air traffic between Asia and Pacific region with the other parts of the world: Middle-East, Europe and Africa. There were nine International Major Traffic Flows within Jakarta FIR:

1. Asia Pacific ATS Route
2. Asia ATS Route
3. Africa/Asia/Middle-East ATS Route
4. Asia/Middle-East/Europe ATS Route

Significantly growing air traffic demand and ATC capacity is identified and projected to be continuing, preventing congestion of airspace and handling capacity become the utmost concern of authorities, providers and airspace users

those come together with the expectations to the airspace management/providers in regards to the safety, capacity, efficiency, access and equity, flexibility, global interoperability, predictability, and environment.

1.2 Air traffic management is dynamic and complex. Demand and capacity balancing through the provision of facilities and seamless services in collaboration with all parties are the key the of the air traffic management providers to ensure air traffic and airspace more safely, economically and efficiently. The ATM operational concept vision has therefore been stated by ICAO as follows: To achieve an interoperable global ATM system, for all users during all phases of flight, that meets agreed level of safety, provides for optimum economic operations, is environmentally sustainable and meets national security requirements.

2 BACKGROUND

2.1 Where the air traffic demands regularly outpace the handling capacity of the system, or where the normal conduct of air traffic control is subject to widespread disruption by severe weather, broad solutions of the resulting problems are devised and implemented by traffic flow management. Traffic flow management applies primarily not to single aircraft or to current traffic but to patterns and flows of future traffic.

2.2 Traffic flow management require data about planned flights and long distance flights already airborne, then future demands are estimated and matched with capacities and constraints so that the traffic can be handled, if necessary by re-routing, re-planned flows, or by delays to departure. The air traffic control centres and controllers convert such traffic flow management directives into instructions to specific aircraft of allocated slot times. The involvement of traffic flow management in air traffic control must and will become more common as increase in traffic demands render system saturation more frequent in Jakarta FIR.

2.3 Traffic flow management applies to very large airspaces that can contain thousands of aircraft. Some partitioning of the vast airspace into regions and consequent divisions of the responsibilities can become a practical necessity, yet traffic flow management must apply to the whole airspace, and problem must not merely be transferred to another region.

3 SECTOR CAPACITIES WITHIN JAKARTA FIR.

3.1 Air traffic movements in Asia Pacific region are forecasted to grow at an average annual rate of 4.5 percent for the period 2007-2025. It will increase from 161 million in 2009 to some 211 million in 2015 and 321 million in 2025. Accordingly, it will also increase the traffic density within Jakarta FIR which is most of those air traffic movements will fly through its airspace.

3.2 The sector capacity in Jakarta FIR airspace had reached its maximum saturated ratio and even could reach more than 200% for the last few years and tends to increase for the next years to come. In 2002 the saturated ratio had reached 94.6%, it were estimated will be grow at an average of 142% in 2010 and projected to increase up to 172% in 2015. On these circumstances, establishment of new other sectors and workstations are urgently needed, align with the DGCA Decree No SKEP/122/1997 which stated that once the saturated ratio had reached 80% or higher it was recommended to establish a new sector to divide and share the current workload.

3.3 Unfortunately, there is no ATFM in operation to overcome the problems as prescribed on 3.3 yet the introduction of a first step of ATFM by establishing a FMP (Flow management Position) at Jakarta and Ujung Pandang ACC/APP was still in an unofficial concept stage.

3.4 Under those circumstances described on 3.3, significant human factors problems will arise such as controllers workload and ergonomic of workspaces which tend to exaggerated by the influence of some factors, these include task demands, knowledge, skill , less obviously professionalism, motivation, tiredness, foresight, confidence, the deployment of resources, planning horizons. The workload of a controller can be increased greatly by an adjacent inexperienced colleagues and mistrusted equipment, consequently will pushing the air traffic controllers to their limits.

4 AIRSPACE RESTRUCTURE, ATS ROUTE AND FLEXIBLE USE OF AIRSPACE (FUA) WITHIN JAKARTA FIR.

4.1 Jakarta FIR which managed and organised by PT Angkasa Pura II was divided by sectors/TMA as follows: Jakarta Control Area, Upper Control (UP), Upper Control Tanjung Karang (UT), Upper Control Kalimantan (UK), Upper Control Semarang (US), Lower Control East (LE), Lower Control North, Terminal Control Area West (TW), Upper Control Medan and Control Zone Jakarta (CTR).

4.2 The restructure of airspace within Jakarta FIR was driving by the significant growth of air traffic movement throughout the region which challenging the previous operational concept of airspace structure that should be addressed the current and future demands of air traffic movement which most likely will affect to target level of safety and efficiency. ICAO Doc.9854: Global Air Traffic Management Operational Concept stated that the operational concept in ATM should addresses what is needed to increase user flexibility and maximize operating efficiencies in order to increase system capacity and improve safety levels in the future.

4.3 The basic principles of an ideal airspace design are to make it possible for arriving, departing and en-route flights to operate so that they did not have to cross another, or climb and descent through each other's level. Furthermore, approach and take-off flight paths would be free of obstacles. It is unlikely to design this "ideal" design environment within Jakarta FIR which is become more

complicated with hundreds of ATS routes and thousand of aircraft movements in a day, however authorities and regulator should take all necessary steps and measures to the maximum extent possible to make ATS route design align with airspace design to cater the projected increased of air traffic within Jakarta FIR thus enhance safety and efficiency of air transport.

4.4 One of the concept that should be consider to be applied in Jakarta FIR is Flexible Use of Airspace (FUA) in order to facilitate airspace management and air traffic management in regards to realize of several Air Defence Area utilized by military. The regulation should be sets out rules to ensure better cooperation between civil and military entities responsible for air traffic management that operate in the airspace under the responsibility of states.

5 CONCLUSION

5.1 Jakarta FIR should be restructure comprehensively to cater the projected increased air traffic demands align with ATS route design, airspace design, development of Communication, Navigation and Surveillance technology with regards to harmonize, integrate and collaborate with other adjacent airspace: Ujung Pandang, Singapore, Malaysia and Australia.

5.2 ATFM was urgently needed in Jakarta FIR, within which ANSPs can forecast traffic demand and available ATC capacity at ATC sector level and thus appropriate scenarios and sector configurations can be put in place for the day of operations in a real time basis if possible.

5.3 The application of ATFM will improved information concerning demand and system capabilities and will prevent system overloads, ensuring manageable workloads for air traffic controllers in which they will protected from those consequences where they have to control a congested airspace which is exceeding its capacities and from receiving more traffic than the controller can handle safely.

5.4 A propose joint military-civil agreement should be initiate on the basis of mutual benefits on establishment of Flexible Use of Airspace (FUA) to increase handling capacity of Jakarta FIR on the paramount concern of safety, regularity and efficiency of airspace user.

ANNEX 5: SAFETY MANAGEMENT SYSTEM

There is an ICAO requirement to implement a Safety Management System (SMS) within ATM services. There is also an ICAO requirement to implement Quality Management (QM) within Aeronautical Information Services (AIS).

In an organisation with a developed safe culture a Safety Management System is integrated in all operational activities. Foremost a Safety Policy is established stating the aim of the safety work for the organisation. SMS can be seen as four different parts integrated in a process.

1. Organisation and Safety Culture
2. Proactive Safety work
3. Reactive Safety work
4. Surveillance

1. Organisation and Safety Culture

- The Accountable Manager has the overall responsibility for Safety within the organisation but all employees have a responsibility to ensure that all activities are conducted according to the Safety Policy.
- It is every managers' responsibility that employees are encompassed by a high level of safety culture, that enough HR with adequate competence for safe work are available, that lessons learned are shared and the safety level is always monitored.

2. Proactive Safety Work

- A proactive safety culture is established among all staff and encompasses all ATM/CNS activities (staff, procedures and equipment)
- Introduction of new systems or changes in current systems shall not take place without a risk assessment has been made prior to implementation
- Trends and identified problem areas should be analyzed and necessary actions taken.
- Cooperation and bench marking with international/national organizations with the aim to develop and use of Best Practices.

3. Reactive Safety Work

- Safety related deviations and identified risks in the current system are reported immediately, analyzed and corrective measures are taken to prevent a reoccurrence.

4. Surveillance

- Safety audits and regular follow-ups are conducted to monitor the safety level in order to identify possible risks and take action before the risk develops into a problem.

Comment from consultants:

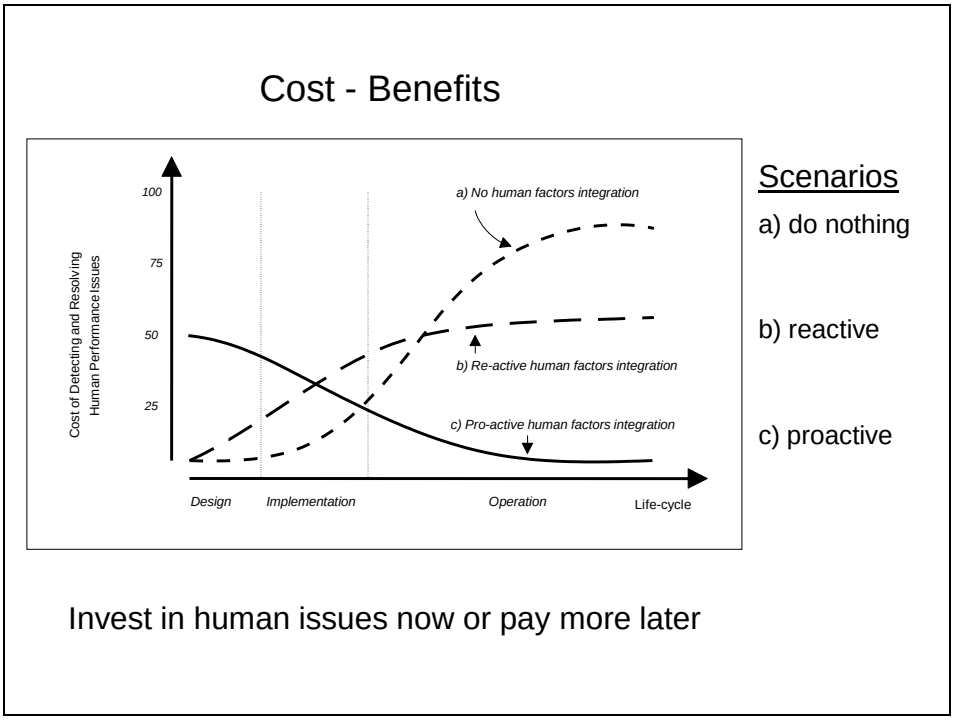
Issues that rose during meeting sessions concerning SMS will be elaborated and developed in the ATM Master Plan. See also chapter 8 in WP 2

ANNEX 6: HUMAN RESOURCE MANAGEMENT

General

Like all organisations dependent on professionals the human element is the most critical one. Although having high technology equipment the staff remains the main capital which should be dealt with in accordance with modern principles of Human Resources Management (HRM). That includes establishing of structures, policies, regulations, methods, guidelines etc concerning HRM. Implementing a HRM system demands resources in terms of staff with appropriate competence and would also need training of managers.

It is a general accepted understanding that the most efficient way of working with the human capital (staff) is to act pro-actively instead of acting re-actively or not act at all, ref below picture.



It has not been possible to find any specific description of an HRM system within DGMAN. There are components related to an HRM system such as a salary system, a rostering system and manpower planning actions. However no integrated system with uniform standards has been possible to identify. Moreover no specific competence or knowledge within this field was possible to identify.

Staffing/Recruitment//Training

Strategic HR Planning is essential to have the right amount of professionals well qualified for the current work but also for new tasks being developed by new technical equipment and new procedures

This involves a :

a) Staffing plan,

b) Recruitment program,

c) Training program

Motivation – work environment

The motivation factor is based on commitment from the employer to the employee. It covers staff – management but also management – management. Motivated employees produce more than not motivated. Factors influencing the motivation factor are (among others):

- Working conditions (salary, rooster etc)
- Work culture (relation to others colleagues/bosses)
- Work load and variety of tasks
- Support from management.

Comments from consultants:

Issues that rose during meeting sessions and received written comments concerning HRM will be further elaborated and developed in the ATM Master Plan.

ANNEX 7: COMMENTS FROM DGCA

Some flow management issues for Indonesia can be addressed relatively simply, with the following recommended for the short term:

1. Develop, publish and audit requirements for flight planning.
2. Revise air routes to: reflect airport positions; divide high and low routes (rather than domestic and international); introduce appropriate one-way routing for busy routes; and comply with ICAO route naming conventions.
3. Implement a consultative forum (with representatives of airlines, ANSPs, airports & regulator) and as a first task develop a traffic prediction capability.

Chapter 2

The introductory section of Chapter 2 immediately starts with some specific solutions rather than a description of the service that is required (e.g. Flow Management position in the ACCs).

A number of complex concepts are introduced throughout the document without clear description or definition (e.g. Airspace Management Cell).

Kick-Off Meeting

- The second item in the list refers to regulating traffic at peak hours at one airport after coordination with Airport and Airline. The coordination is critical and something that is lacking (in any formalised way) at most airports; very little coordinated aviation industry consultation occurs in Indonesia. It is recommended that a formalised requirement to introduce consultation is included in the Master Plan.
- The possible introduction of FUA needs to be carefully considered and will be quite difficult in Indonesia, at least initially. If FUA is a goal that is included in the ATM Master Plan, the plan needs to set out small, achievable steps for accessing some of the large areas of military airspace on a temporary basis (with the approval and decision making the responsibility of the TNI alone in the first instance).

Traffic Flow Management

- Development of a centralised ATFM unit for Indonesia would be better implemented at the same time as JAATS replacement (i.e. a medium term goal); more basic issues such as ensuring aircraft do not get a clearance unless a valid flight plan has been received by the unit issuing a clearance, should be the short term focus.

Aerodrome Design and Management

- In this section the consultants refer to the “need of A-SMGCS for Jakarta Soekarno-Hatta airport”. Has this need really been identified? Isn’t the need actually (at busy airports, not just one airport):

- Proper implementation of surface movement control, including a common frequency for all ground operations;
- Use of English for communications;
- Procedures for indicating when runways are occupied (either by ground vehicles or aircraft);
- Improved visibility of manoeuvring areas.

The ultimate solution may well be A-SMGCS, but the Master Plan should set out the kind of service that should be applied and the way that service will be provided (including the kind of technology) should be determined by the appropriate people within Indonesia.

Runway Operations

- The working paper mentions that coordination between AIS and air traffic service authorities is required by regulation. But is it enforced? Doe the regulations reflect the actual situation?
- The section includes recommendations for closely spaced parallel runways. Are there any closely space parallel runways in Indonesia?
- Where did the capacity of 54 movements an hour for Soekarno-Hatta come from? Was it developed by the consultants or did it come from somewhere else? How was it calculated?

Chapter 4: Airspace Organisation & Management

The discussion and description of possible FUA work is good, although there are many other much higher priority activities to be undertaken. Either all activities need equivalent levels or information and detail, or priorities for each activity need to be clearly articulated.