# Airspace Volumes & Sectorisation

## Module 13 – Activity 9

European Airspace Concept Workshops for PBN Implementation

# Overview

## OBJECTIVE

This module will provide an good understanding of Airspace volumes and Sectorisation supporting ATM

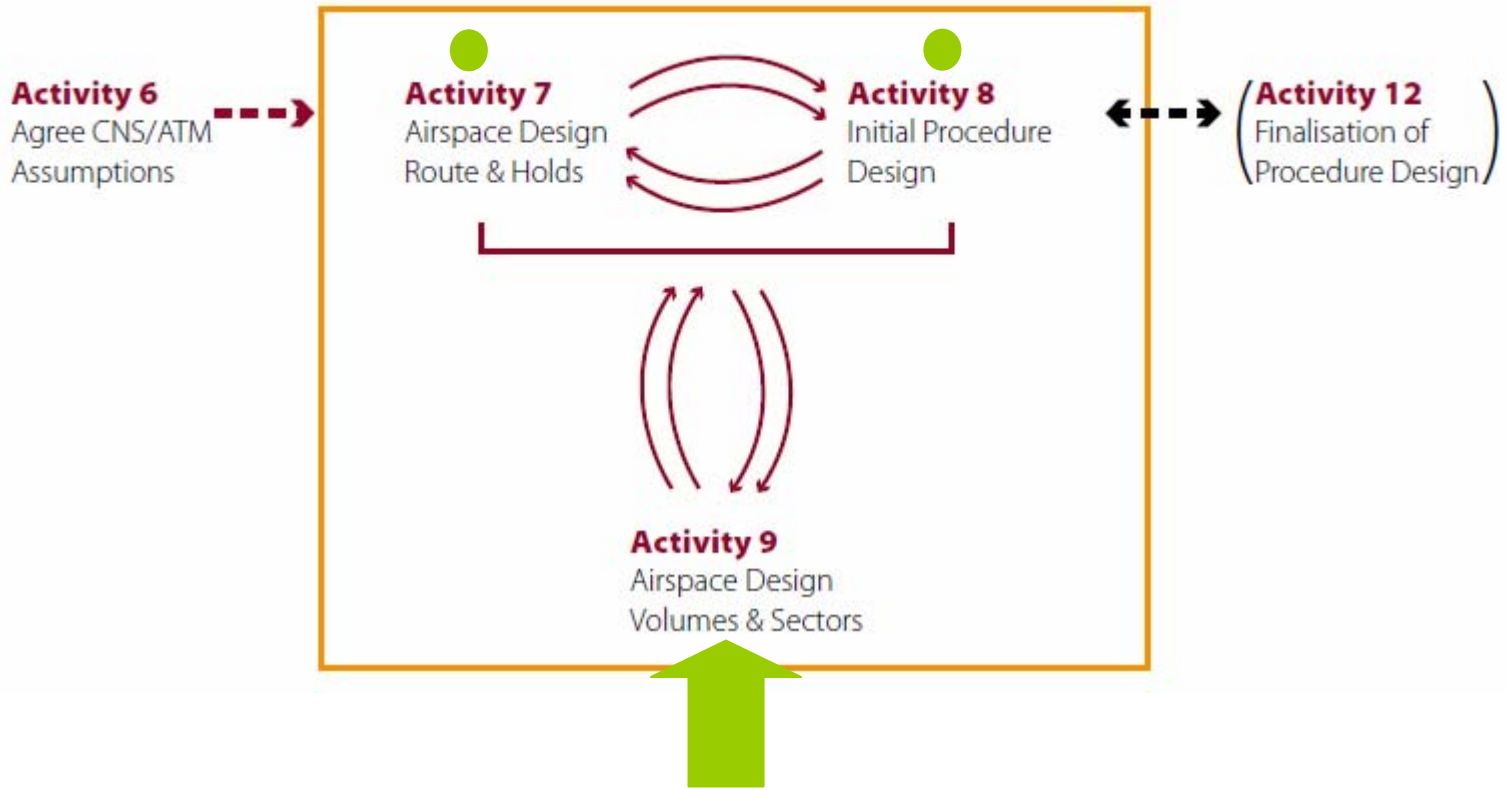
# Three GOLDEN RULES

Airspace Volumes protect the IFR Flight paths. They are Designed AFTER the routes have been designed.

Routes should not be designed so as to fit into pre-existing Airspace Volumes.

Only delineate as much airspace volume as needed.

# Context & Iterations

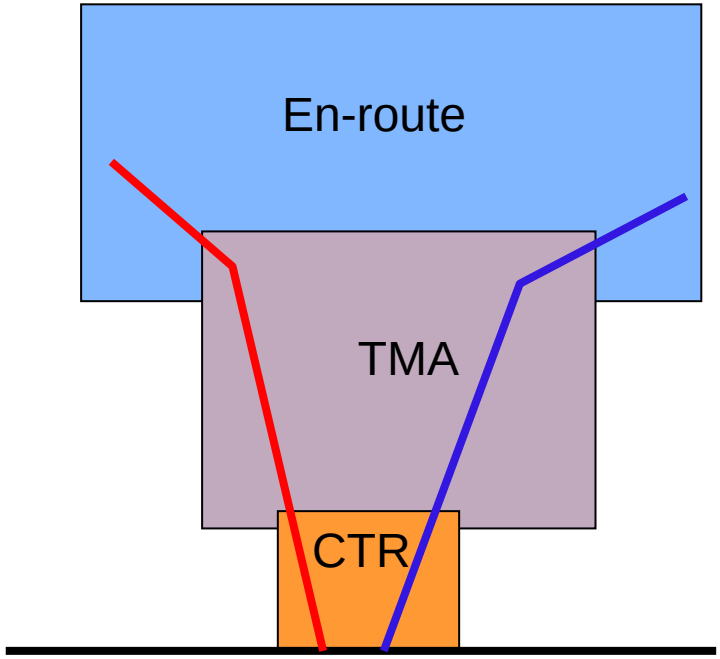


# TMA

## *TMA*

### *Terminal control area*

A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes. [Doc. 4444]

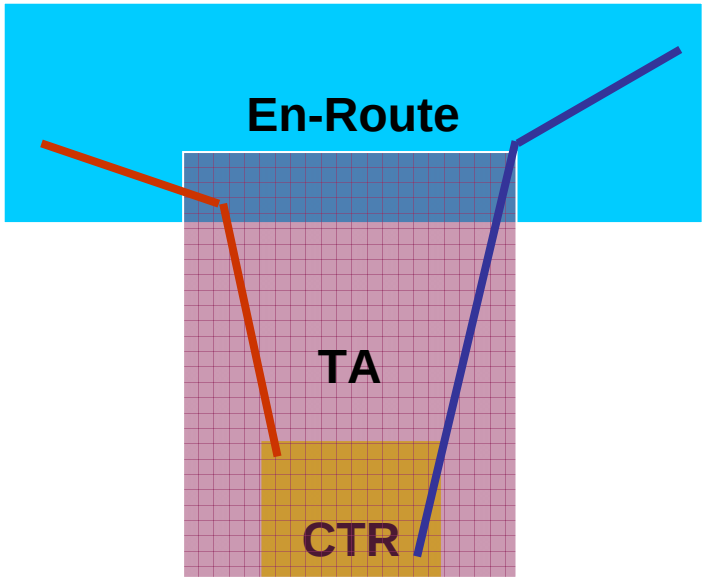


# Terminal Airspace

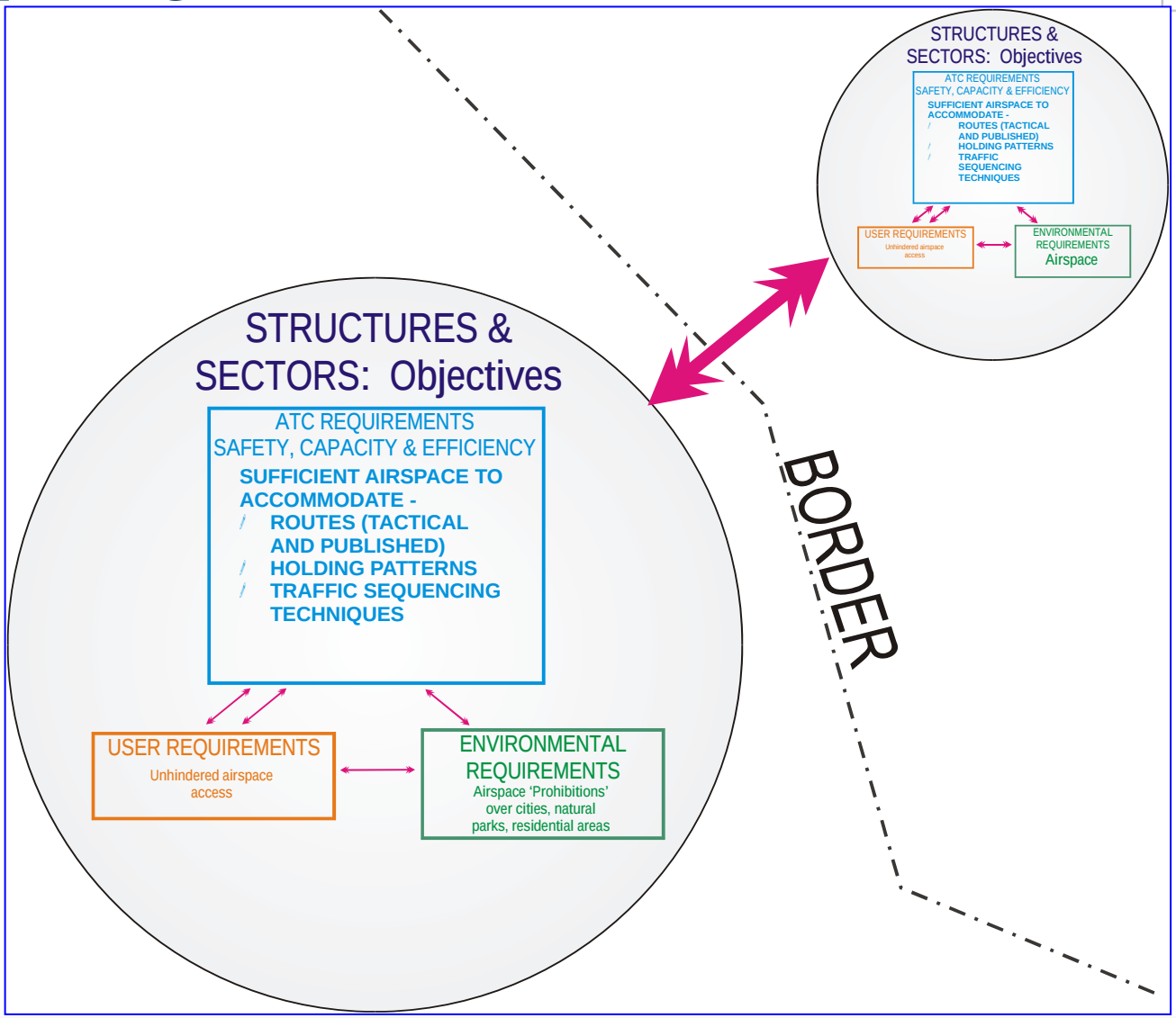
***Terminal Airspace (TA)*** – is a generic term describing airspace which is part of the airspace continuum. Terminal airspace surrounds an airport, and it is an airspace within which air traffic services are provided. It encompasses all the various terminologies currently used throughout the ECAC region. Such airspace predominantly contains traffic operating along Terminal Routes or, to a lesser extent, ATS Routes of the ARN.

*[Explanatory note: The above description is aimed at including TMA, CTA, CTR, ATZ airspace classification or any other nomenclature used to describe the airspace around an airport].*

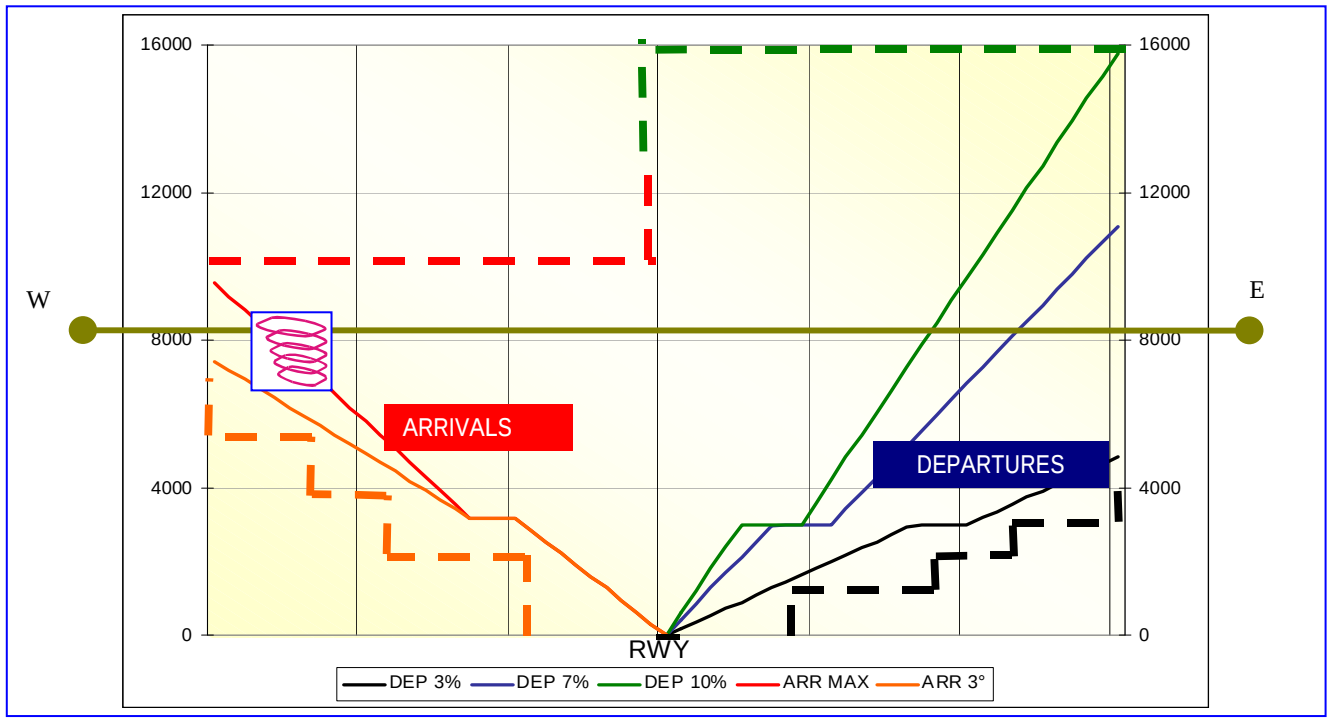
[The 2015 Airspace Concept & Strategy for the ECAC Area & Key Enablers]

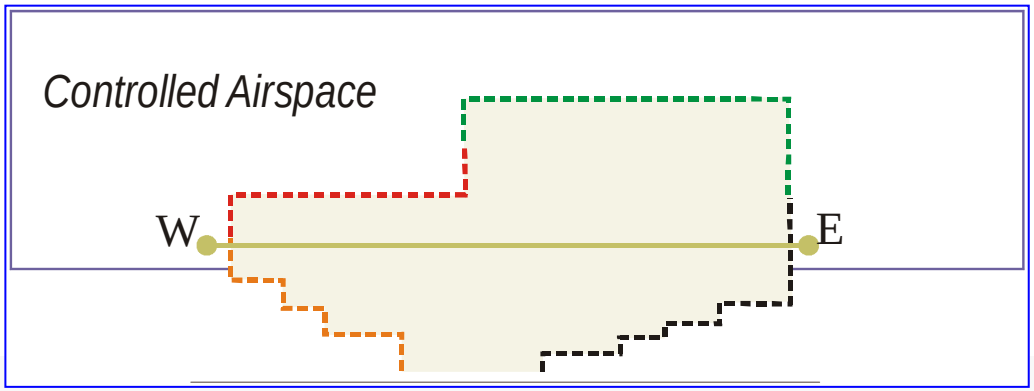


# Competing Interests



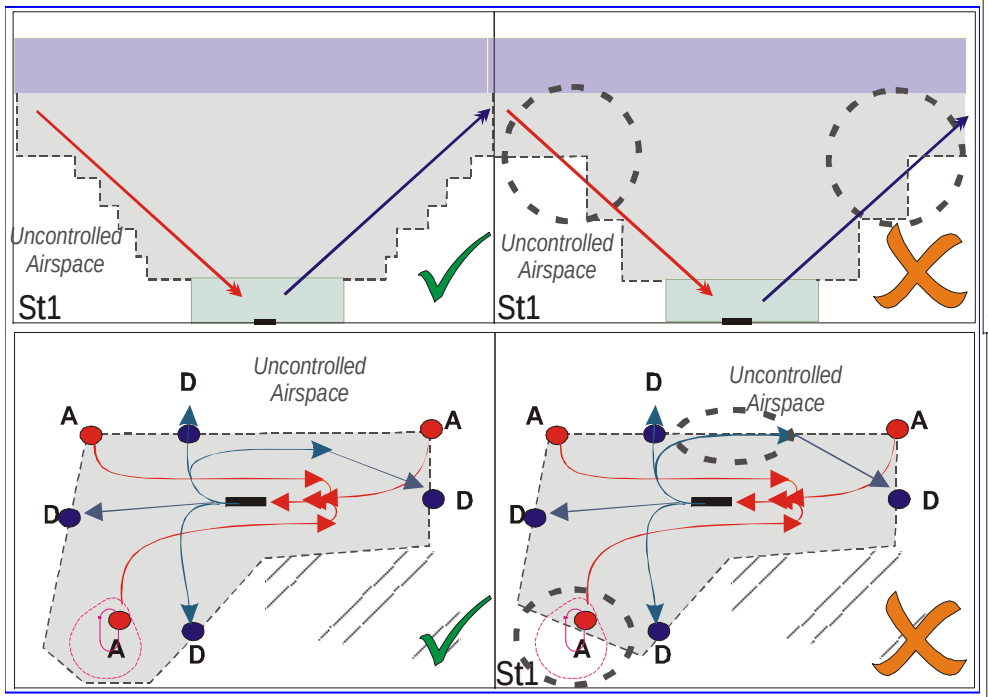
# Airspace Volumes

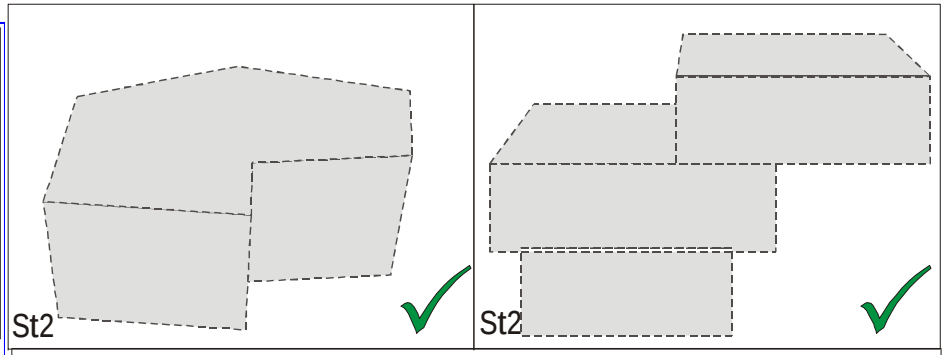


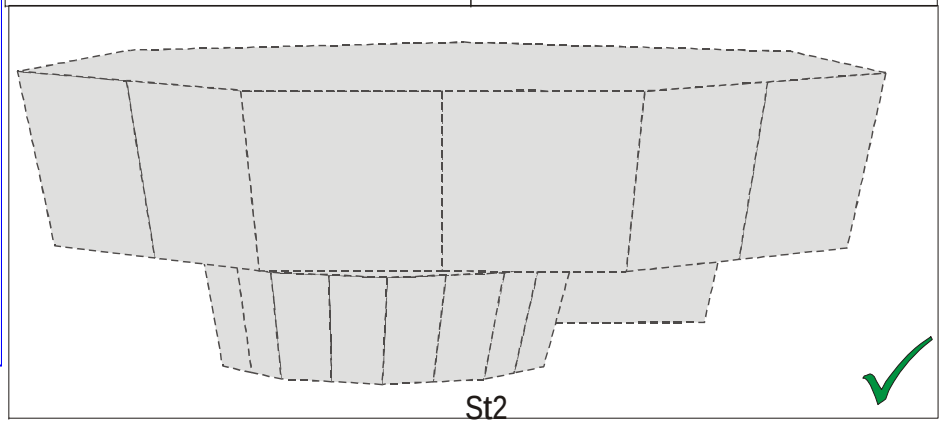



# Airspace Volumes

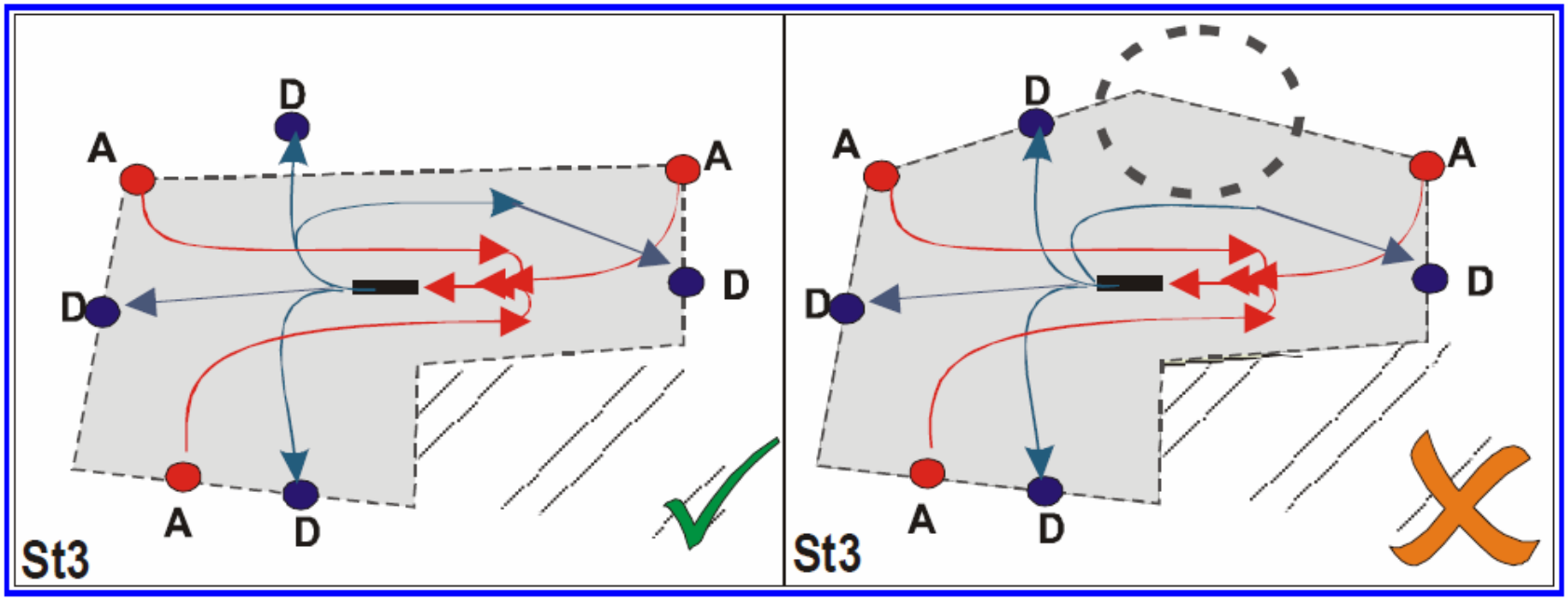
## Protect IFR Flight Paths



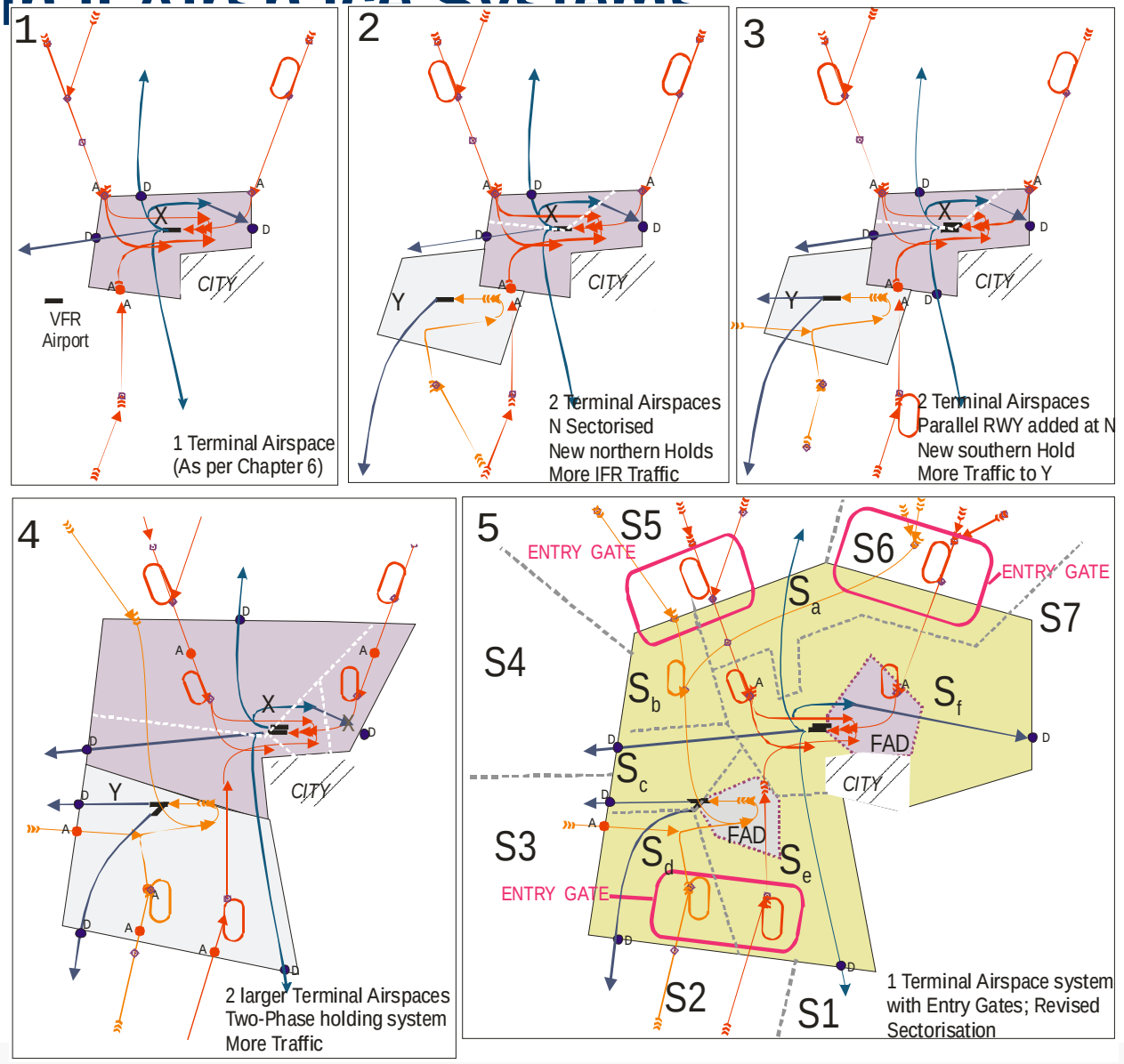



# Airspace Volumes




Take the airspace required – not more.

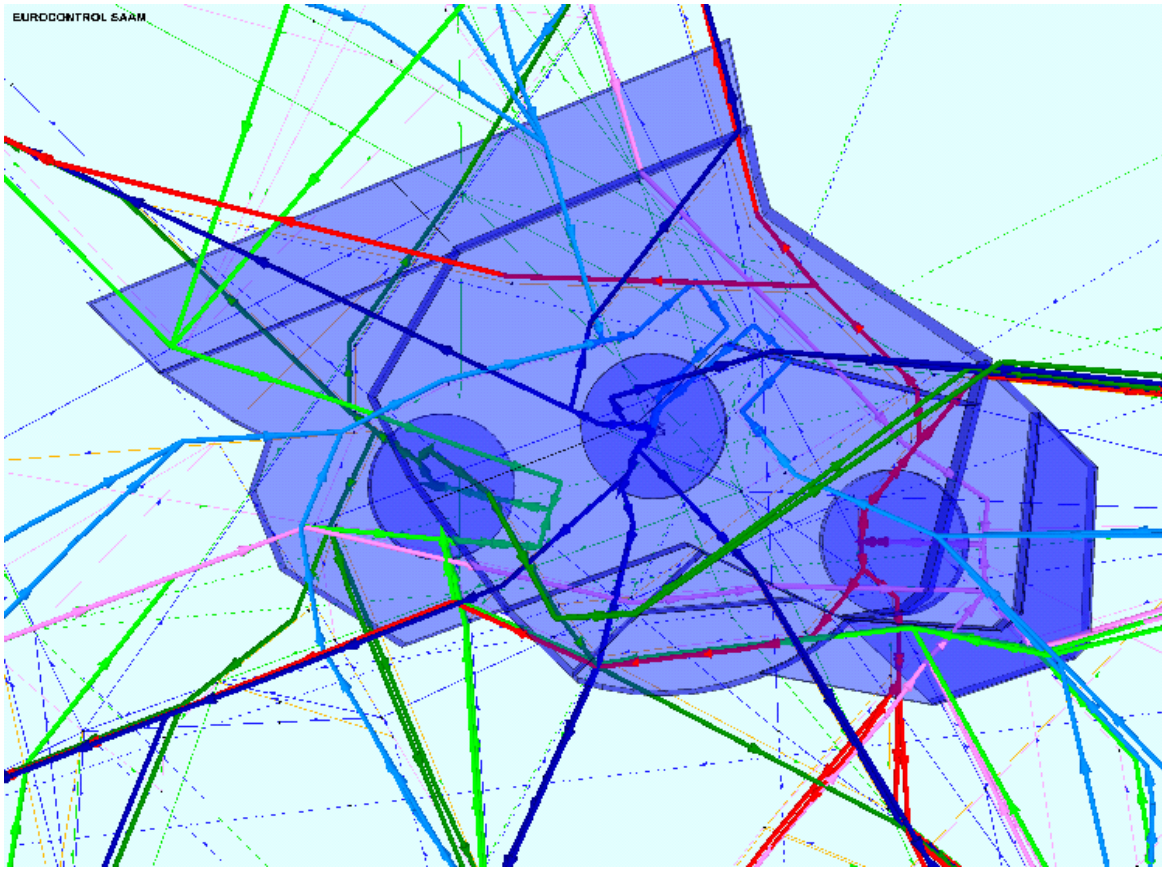
# Terminal Airspace Systems



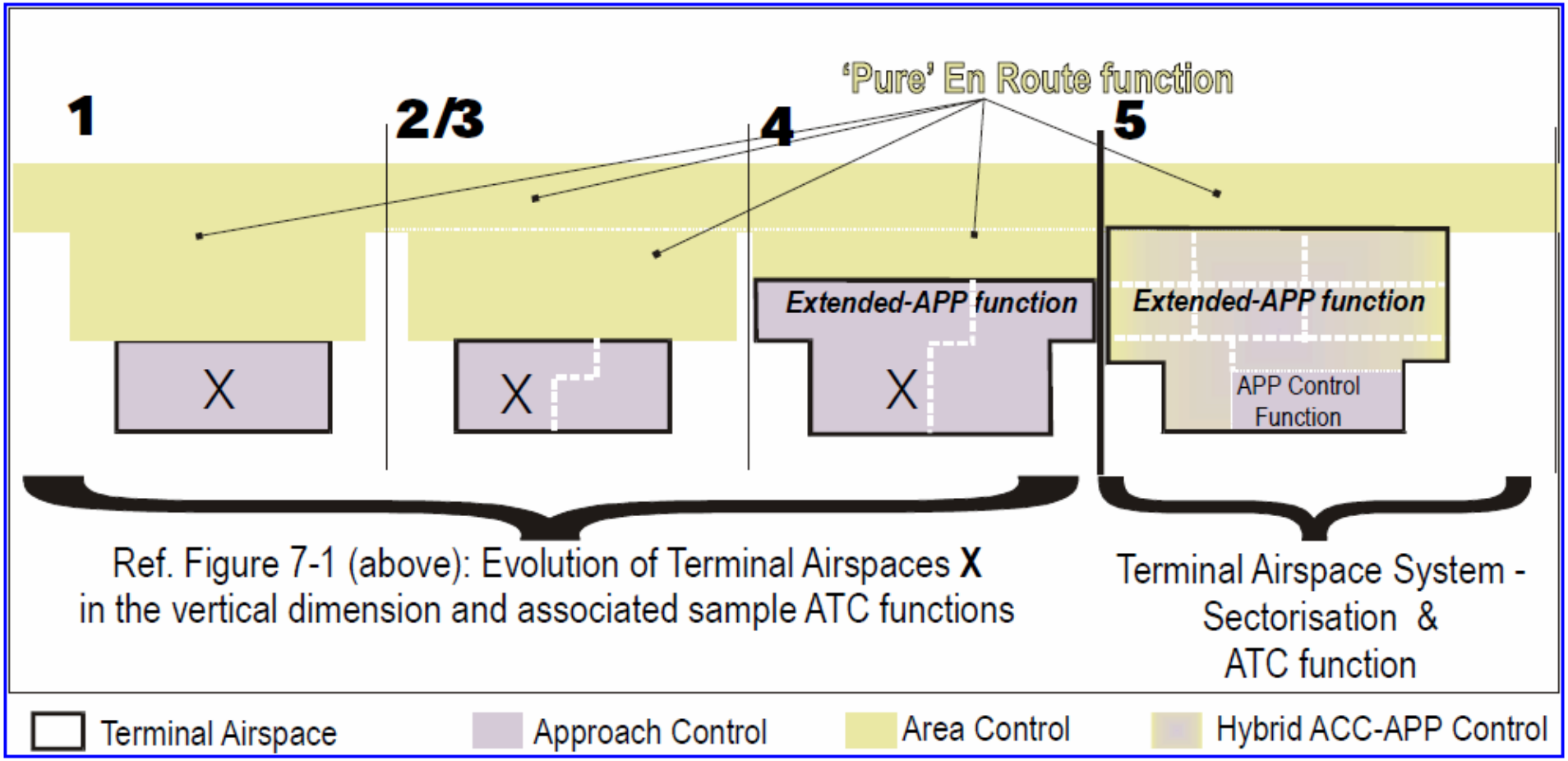
# Terminal Airspace System (= *Metroplexes in US*)

***Terminal Airspace System (TAS)*** – A system that combines two or more terminal airspace Volumes, aimed at improving the design and management of terminal routes and ATC sectorisation, servicing several airports in close proximity.

[The 2015 Airspace Concept & Strategy for the ECAC Area & Key Enablers]



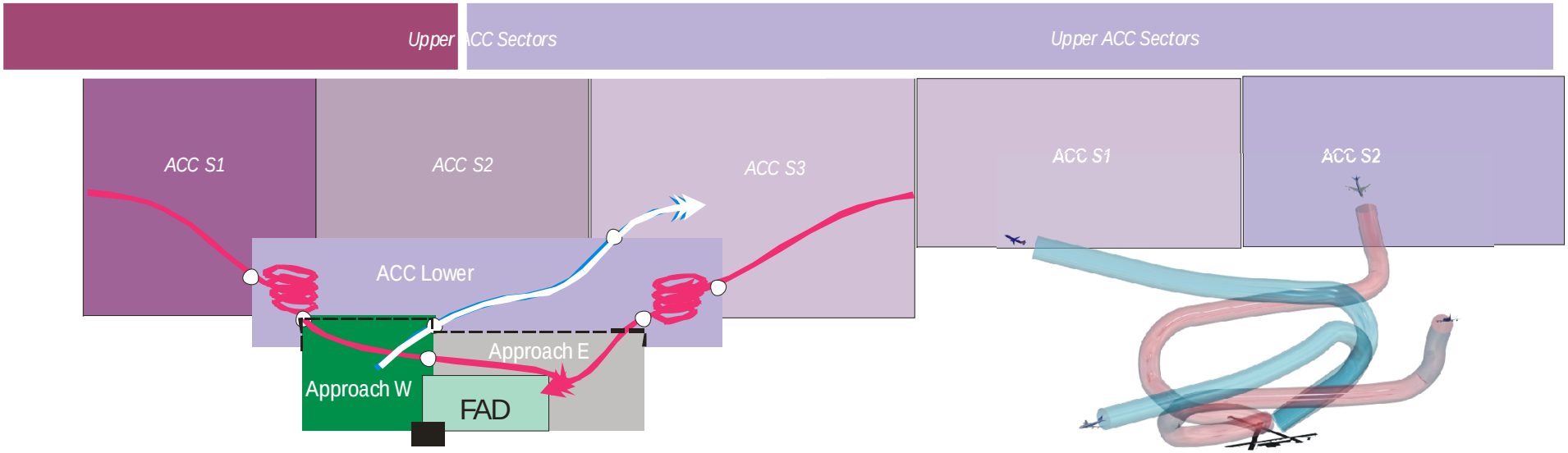
# Evolution of functions



# Sectorisation

- Functional
- Geographical

# ATC Sectorisation




GEOGRAPHIC

FUNCTIONAL

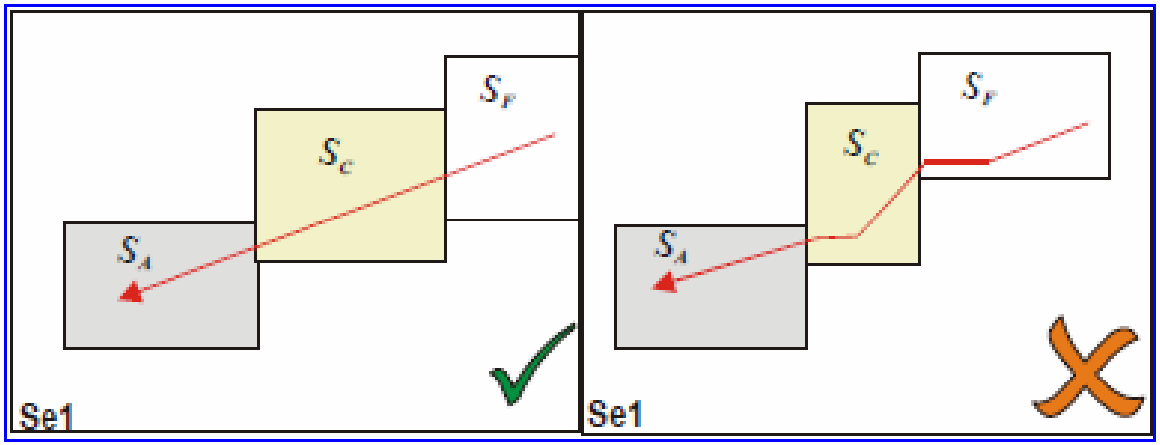
# Geographical Sectorisation

| Advantages | Disadvantages |
|---|---|
| ✈ Controller can fully exploit the space available in sector to manipulate best levels for inbounds/outbounds and expedite climb and descent without need for co-ordination.<br>✈ Easier to balance workload between sectors.<br>✈ Can be less demanding in terms of the Radar Display and ATC system<br>✈ Relatively easily to describe operational instructions for ATC areas of responsibility. | ✈ Controller handles mixed traffic i.e. arrival, departure and transit traffic.<br>✈ In instances where the sector division runs along the runway centre-line, departing aircraft departing in different directions may be controlled by different controllers after take-off. (Effective mitigation can be provided by putting appropriate procedures in place).<br>✈ In cases where an aircraft is required to transit more than one geographic sector in the Terminal Airspace, this can add to complexity by requiring additional co-ordination. |

# Functional Sectorisation

| Advantages | Disadvantages |
|---|---|
| ✈ Controller handles one traffic type i.e. either departures or arrivals because sector defined as a function of task.<br>✈ Usually, *all* Departing aircraft are on the same frequency after take-off.<br>✈ In some configurations, can prove more flexible to operate. | ✈ Vertical/Lateral limits of sector can prove overly restrictive as one (vertical) band is unlikely to cater for all aircraft performance types.<br>✈ Difficult to balance workload between sectors especially where departure and arrival peaks do *not* coincide.<br>✈ Can be demanding in terms of the Radar Display and ATC System<br>✈ Operating instructions for ATC can be difficult to formulate with respect to areas of responsibility; |

# Sectorisation

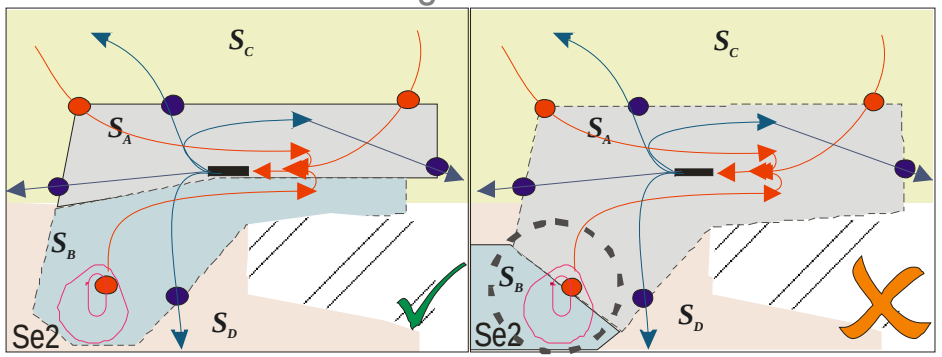



Avoid Sector designs that cause stepped climbs or descents

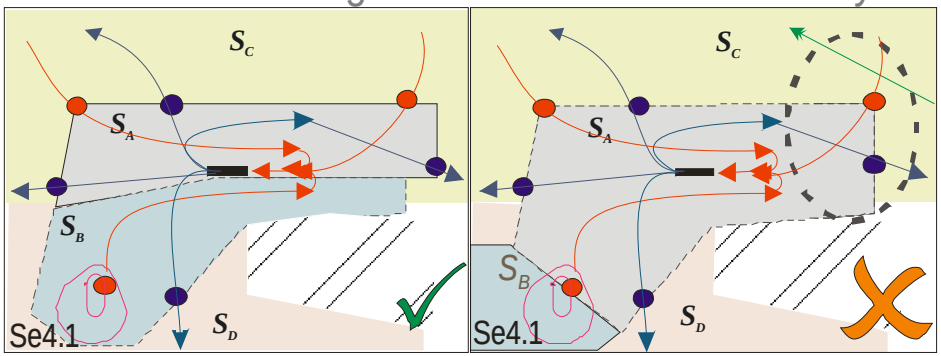
# Sectorisation

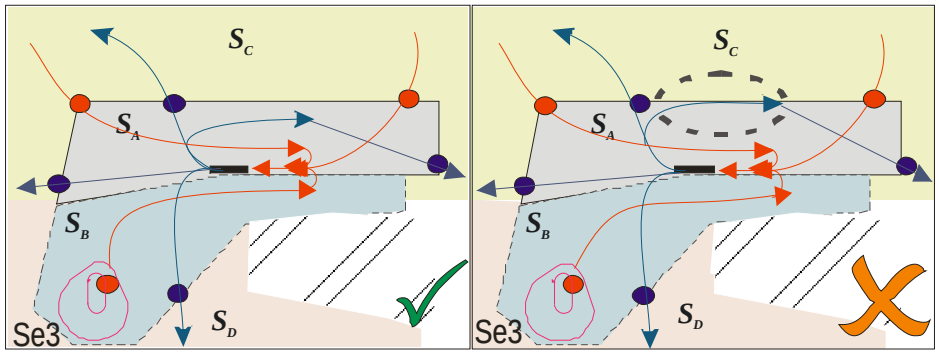
## ATC Sectorisation

Maintain holding area in same sector

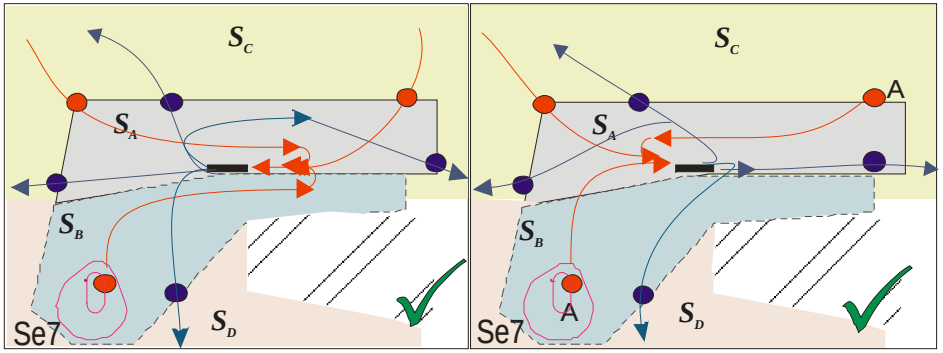



Avoid crossing too close to sector boundary




Sector boundaries should not coincide with route centre lines




Preferably, keep sectors the same when runway changes

# Sectorisation

- **SE4.2:** THE VERTICAL LIMITS OF A GEOGRAPHICALLY DEFINED SECTOR NEED NOT BE UNIFORM I.E. FIXED AT ONE UPPER LEVEL OR ONE LOWER LEVEL, NOR NEED THESE VERTICAL LIMITS COINCIDE WITH THE VERTIAL LIMITS OF (HORIZONTALLY) ADJOINING SECTORS.

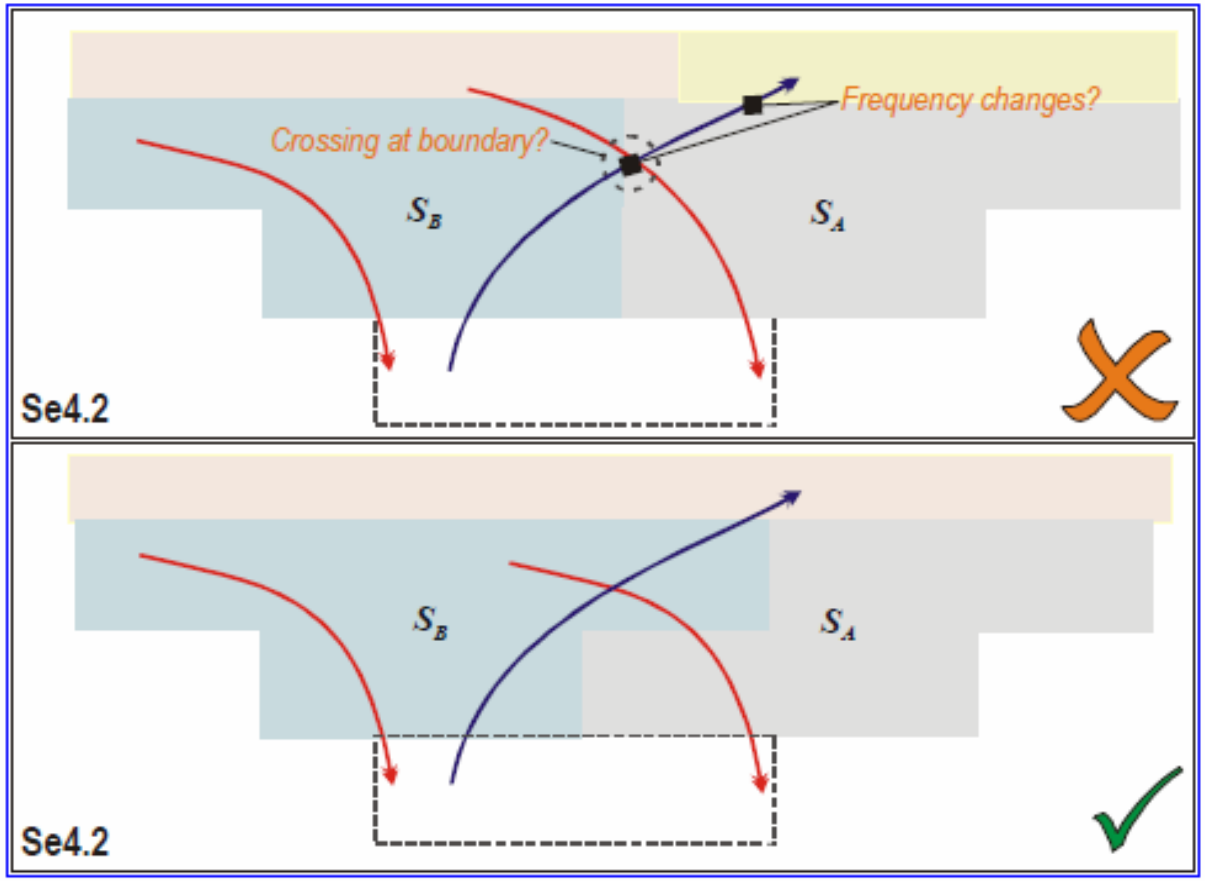
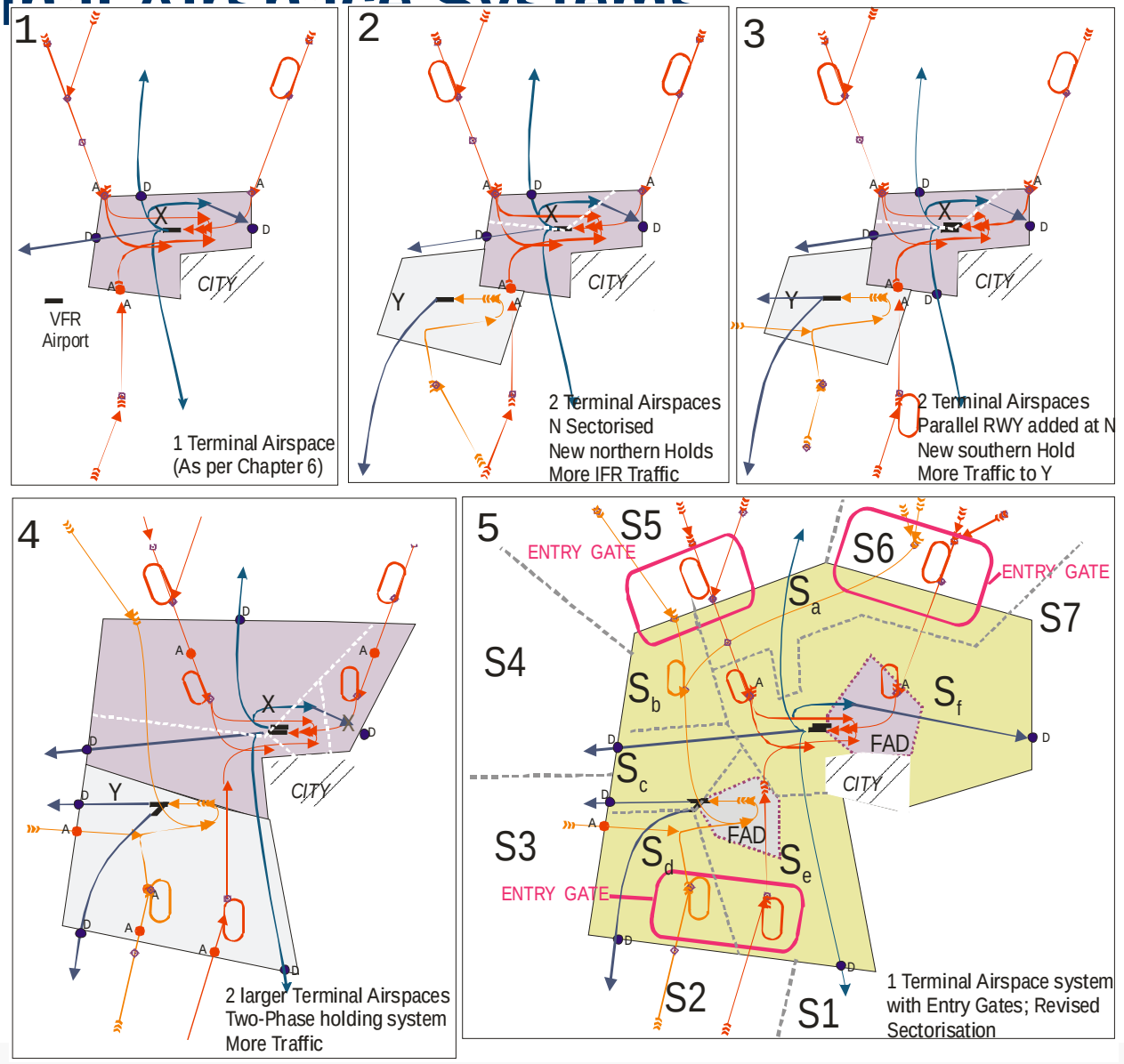
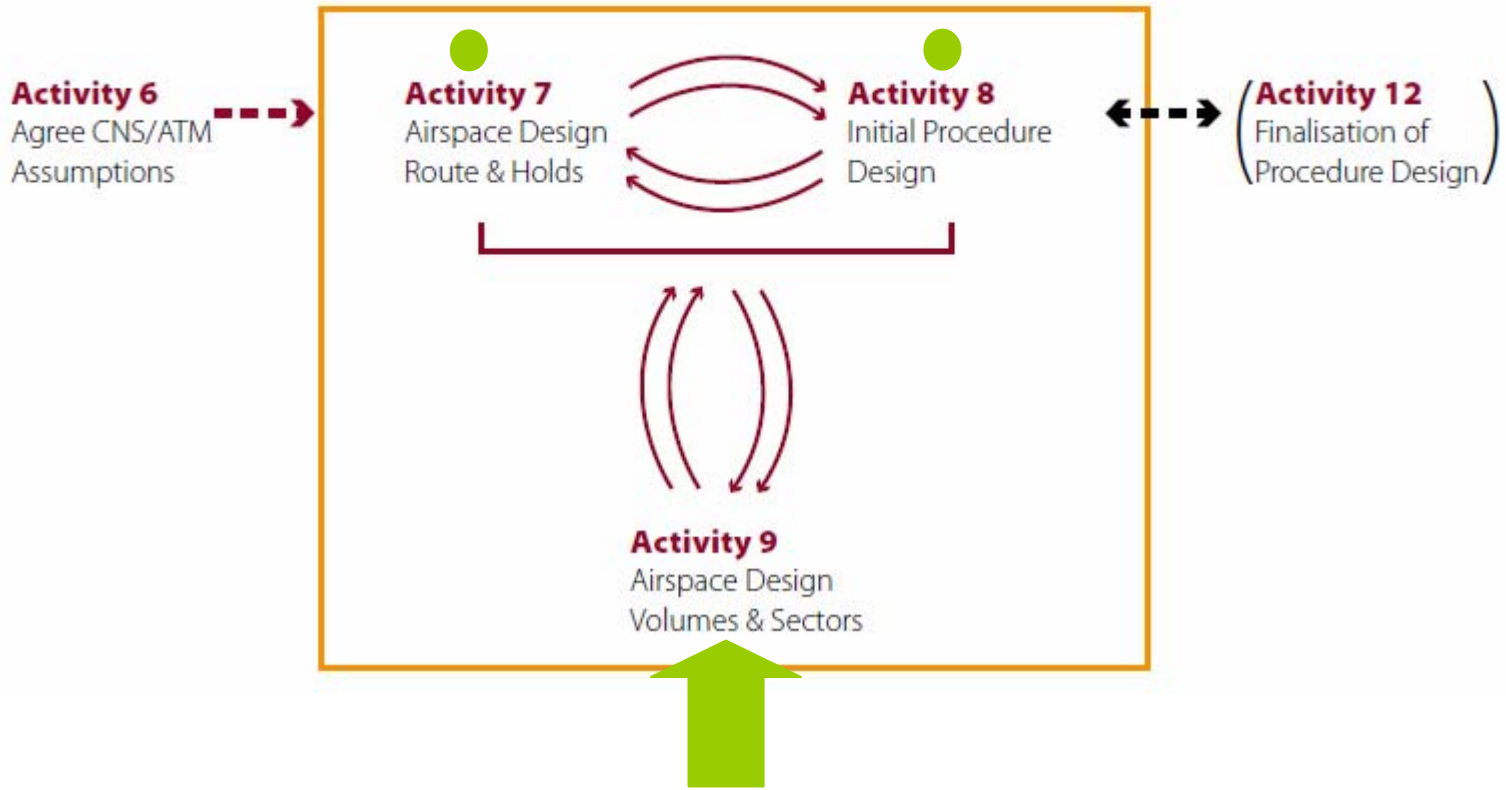



*Figure 6- 15: Vertical Sector boundaries and crossing routes*

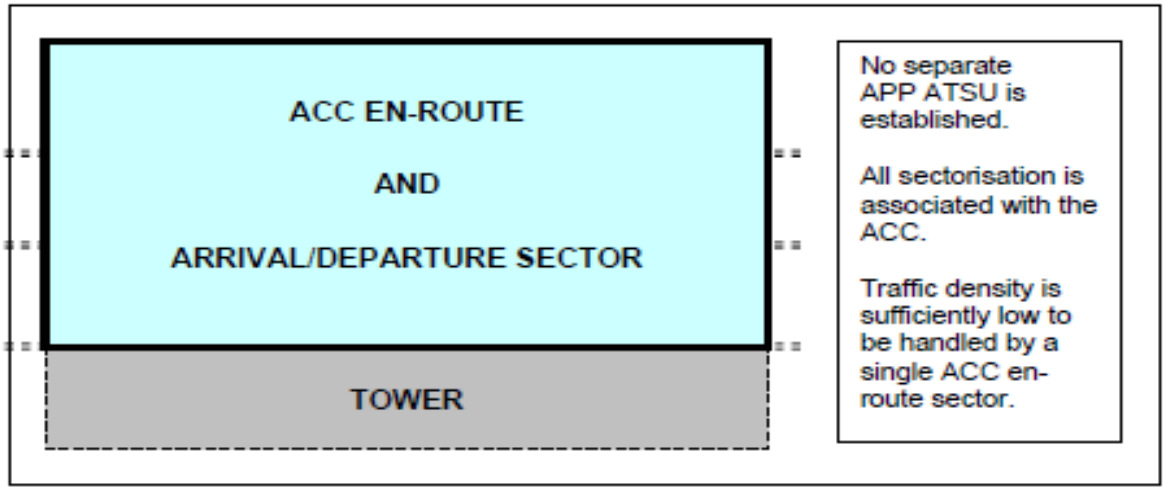
# Terminal Airspace Systems

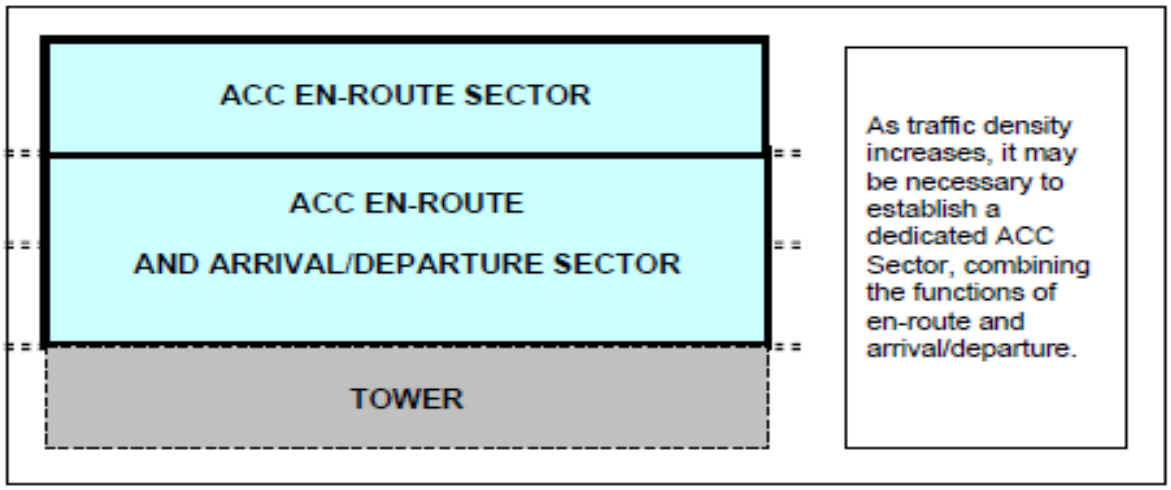


# Iterations

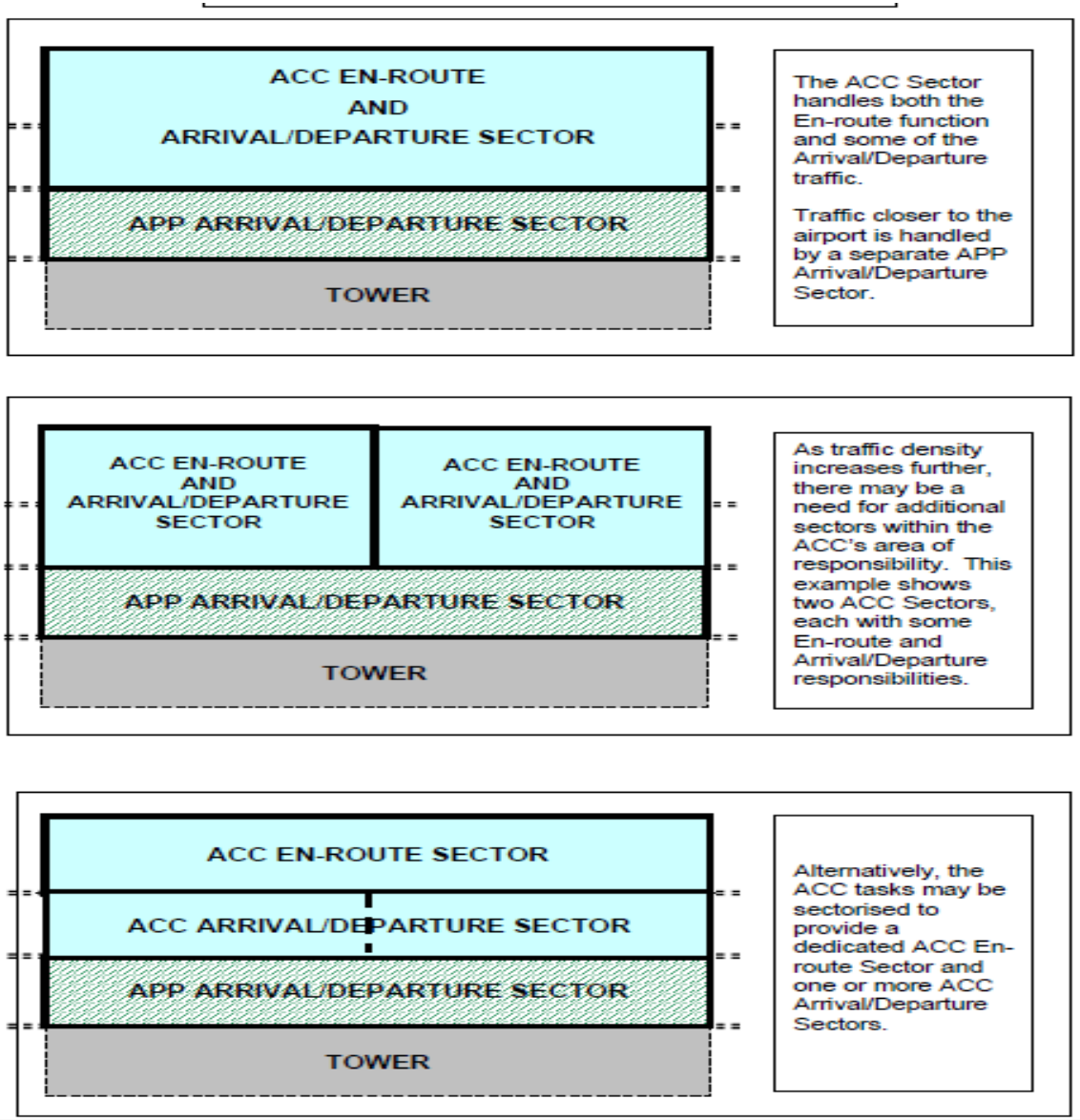

Activity 6
Agree CNS/ATM
Assumptions
Activity 7
Airspace Design
Route & Holds
Activity 8
Initial Procedure
Design
Activity 12
Finalisation of
Procedure Design
Activity 9
Airspace Design
Volumes & Sectors

# Design Options (1)

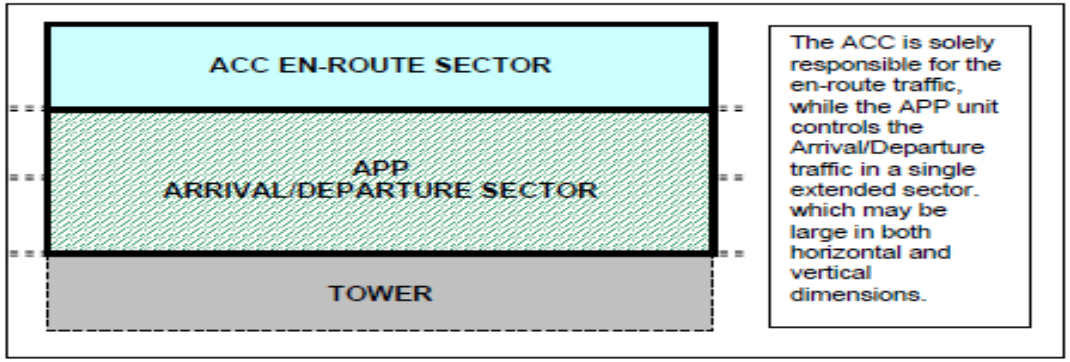


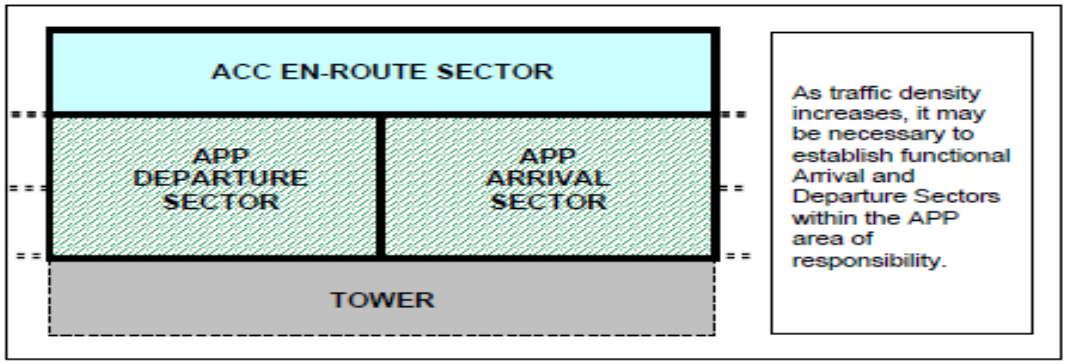



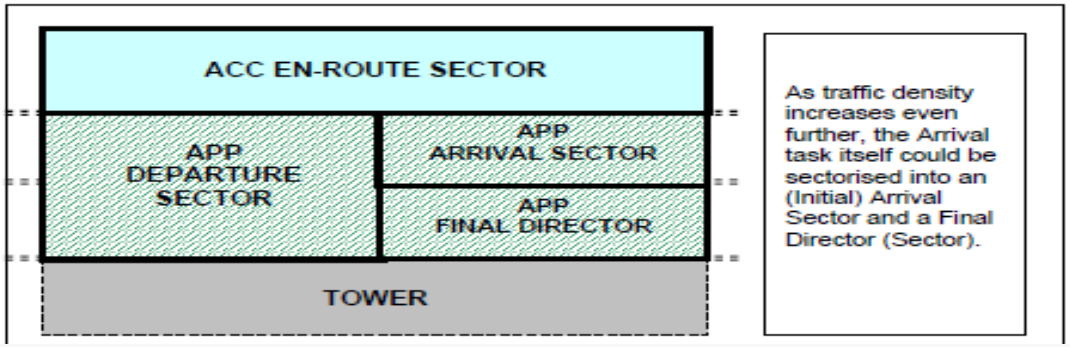
# Design Options (2)



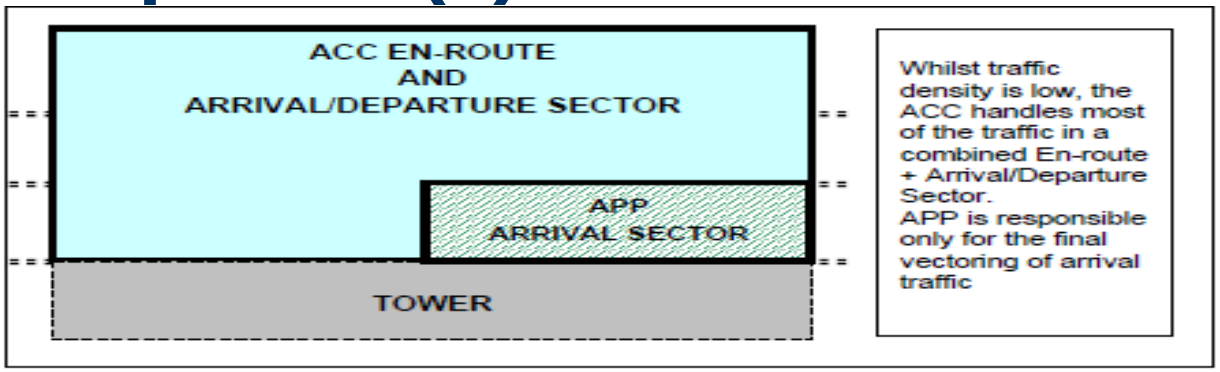
# Design Options (3)

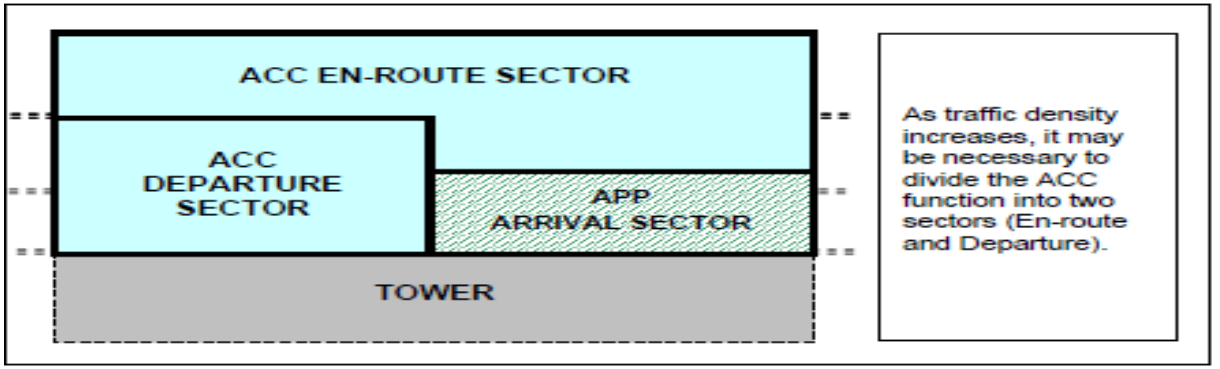


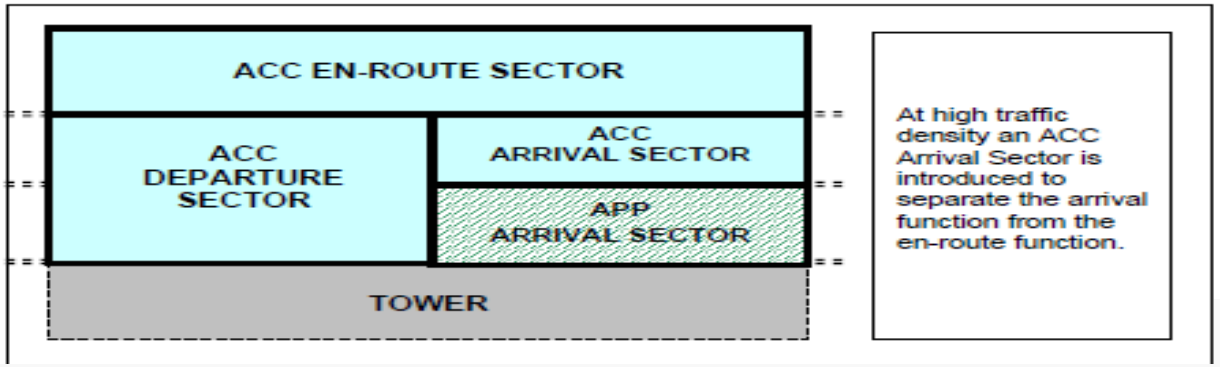



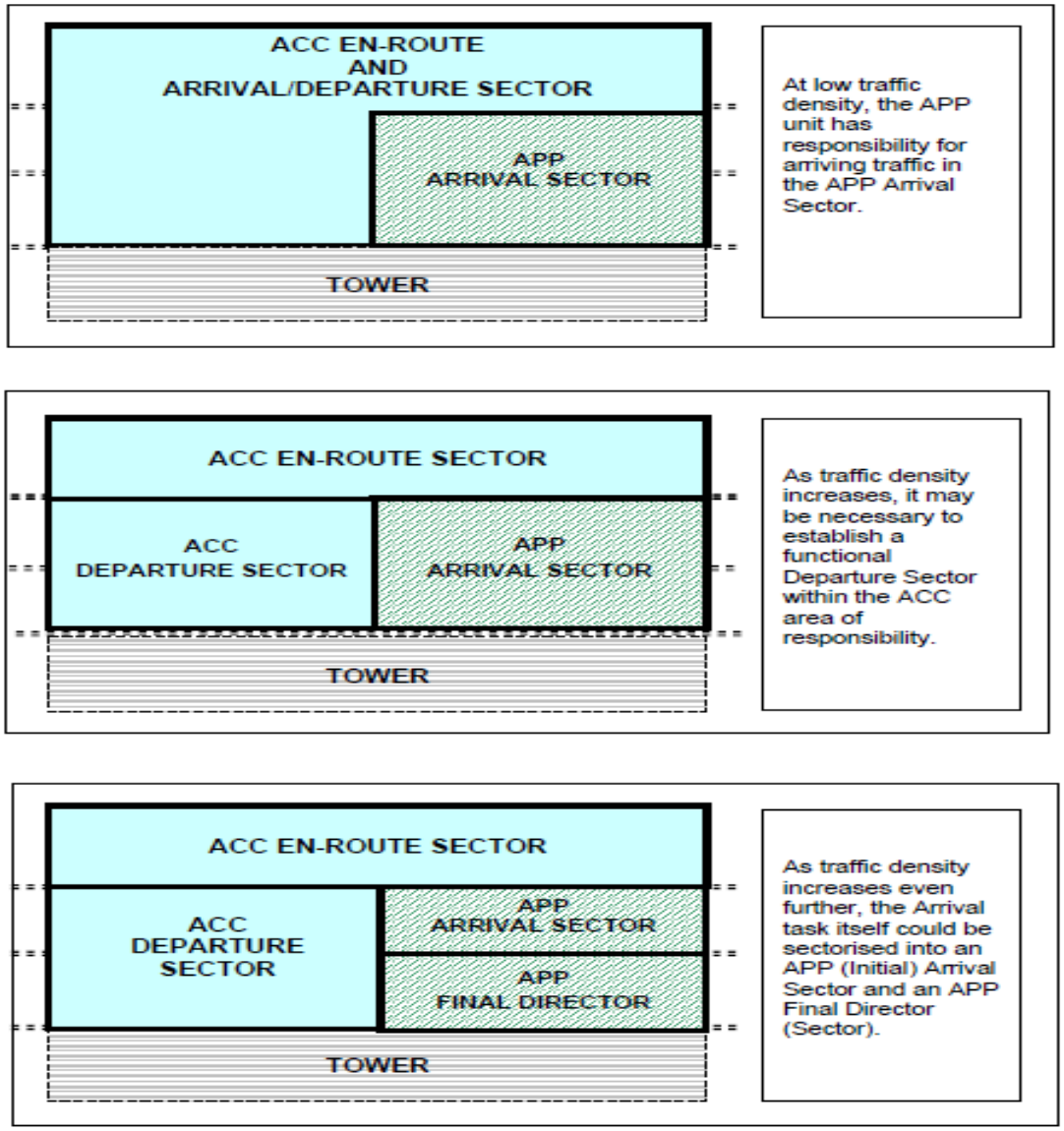
# Design Options (4)



# Design Options (5)



# THANK YOU