

FAA – EUROCONTROL AP9 Modelling Future Concepts

- Gerard Mc Auley
- EUROCONTROL DAS/AFN Unit
- FAA Technical Centre 8 Nov 2005

Objectives of this presentation

In this presentation I would like to

- Tell you a little of what we do
- Consider how we might better use fast time simulation models to analyse future concepts
- Provoke some discussion on how and why we can model future ATM concepts

EUROCONTROL Requirements

- EUROCONTROL has a need to model and analyse the generic application of future ATM concepts
- Generic en-route
- Generic TMA like -
 - » Frankfurt TMA: SLP and vectoring
 - » London TMA; Less SLP and systematic holding
- Our direct customers are the ANSPs of our member states. We are aware of other stakeholders but work through the ANSPs

Why Fast Time Simulation

- We use fast time simulation to answer questions of system planners by providing quantified evidence of system changes expected from external effects.
- Some keywords :
 - Answer questions
 - Quantified Evidence
 - System Changes

Future Concepts

- What new concepts ?
 - Functional Airspace Blocks (FABs)
 - ASAS Spacing
 - Free Flight
 - Multi Sector Planning -- Meta Sector Planning
 - And other variations and combinations of these

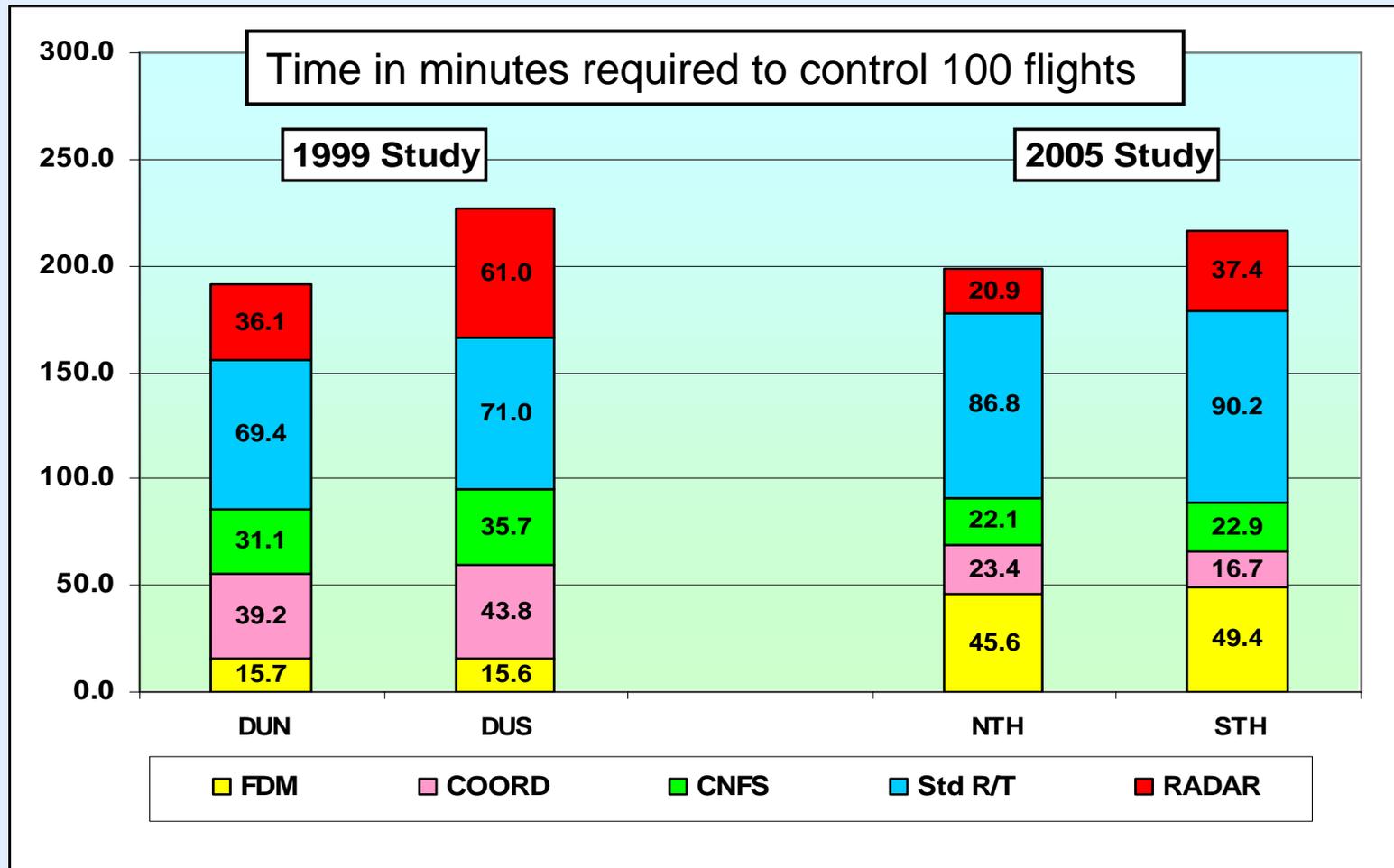
So how do we approach modelling a new concept

- We first ask questions
- We ask ourselves
- What's new about this concept –
 - Does it affect the way that
 - Aircraft fly through the system
 - The way the system manages aircraft
 - The way controllers control them
- What's the granularity – macro or micro
- Do I understand the question being asked by the customer
- Does the customer understand their concept

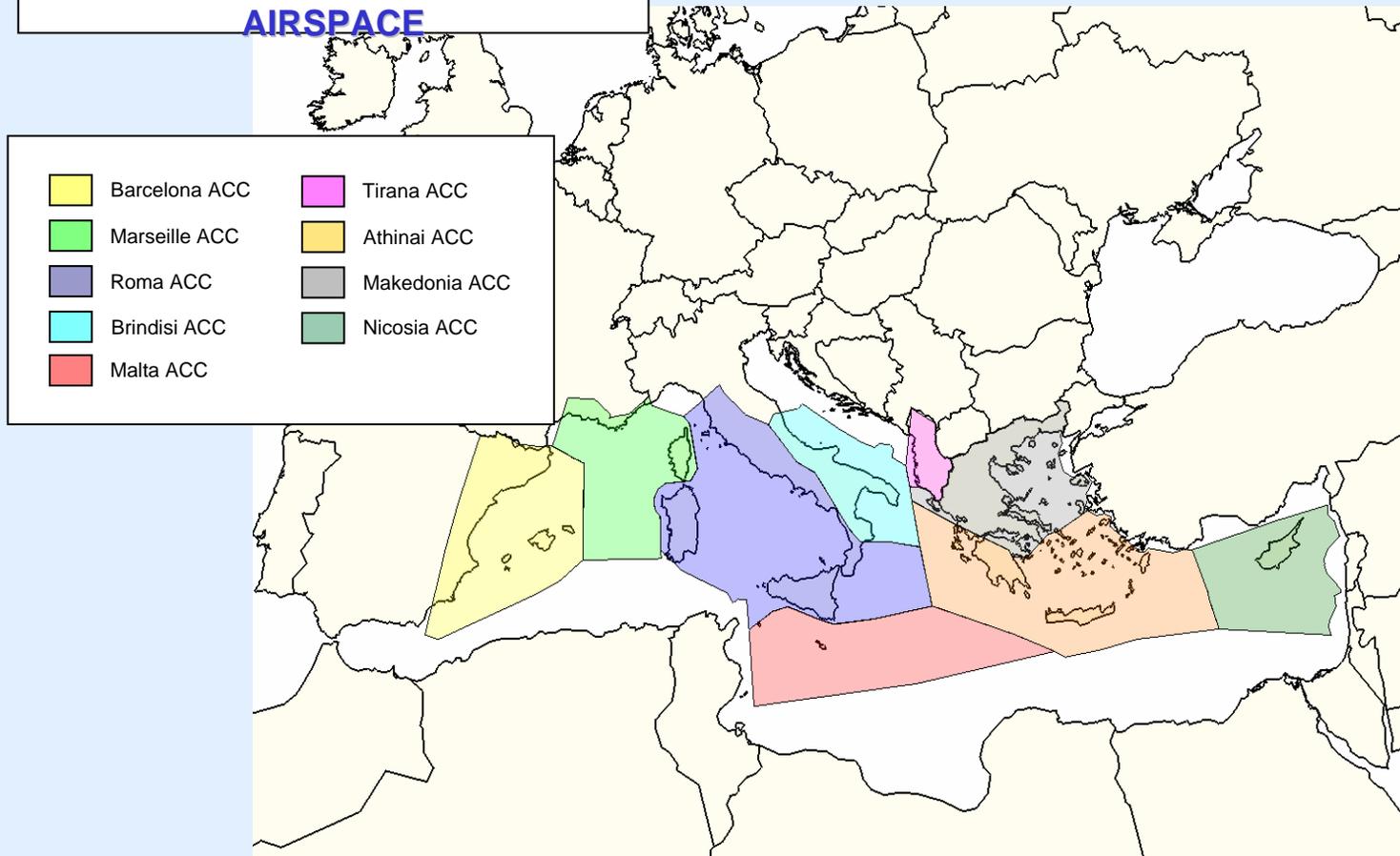
Our mental model of the system

- The airspace is divided into centres and sectors, at the sector level we have
- **A** -Information arrives (flight data – system coord – whatever)
- **B** – Analysis and decisions are made on current situation plus the new information
- **C** – The aircraft arrives under some set of conditions – radio contact
- **D** - The plan from step B is implemented
- **E** - The execution of the plan is monitored and updated as necessary
- **F** – The aircraft is transferred and data is cleaned up

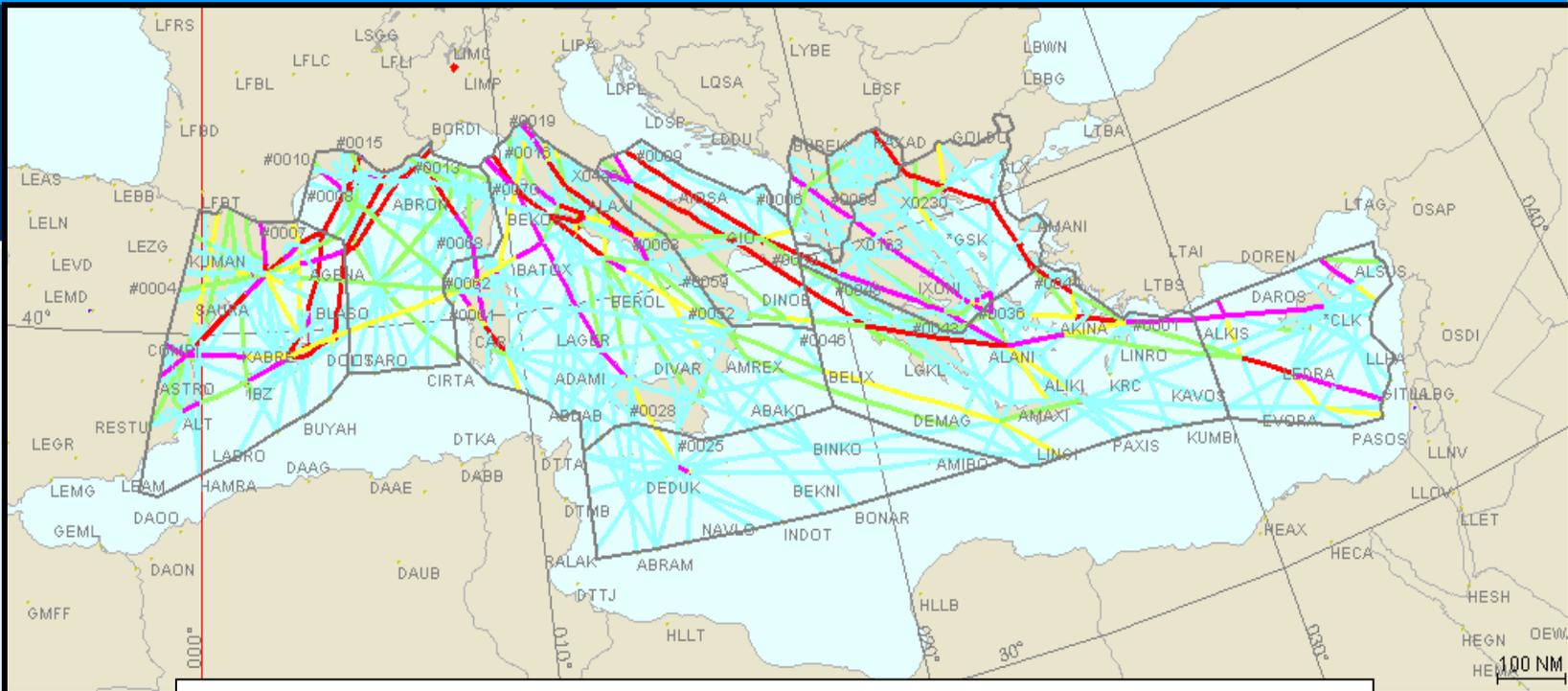
Analysis of Sector Working Time



WP 7.1 MFF CANDIDATE AIRSPACE



2002

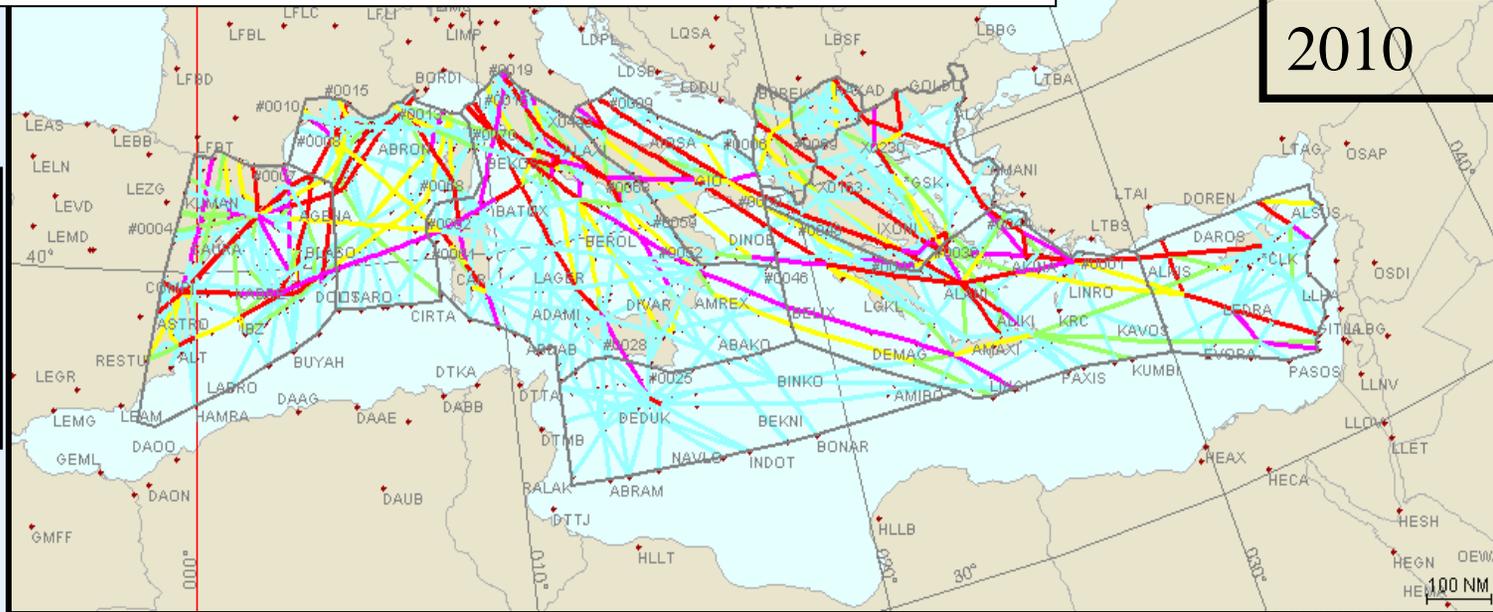


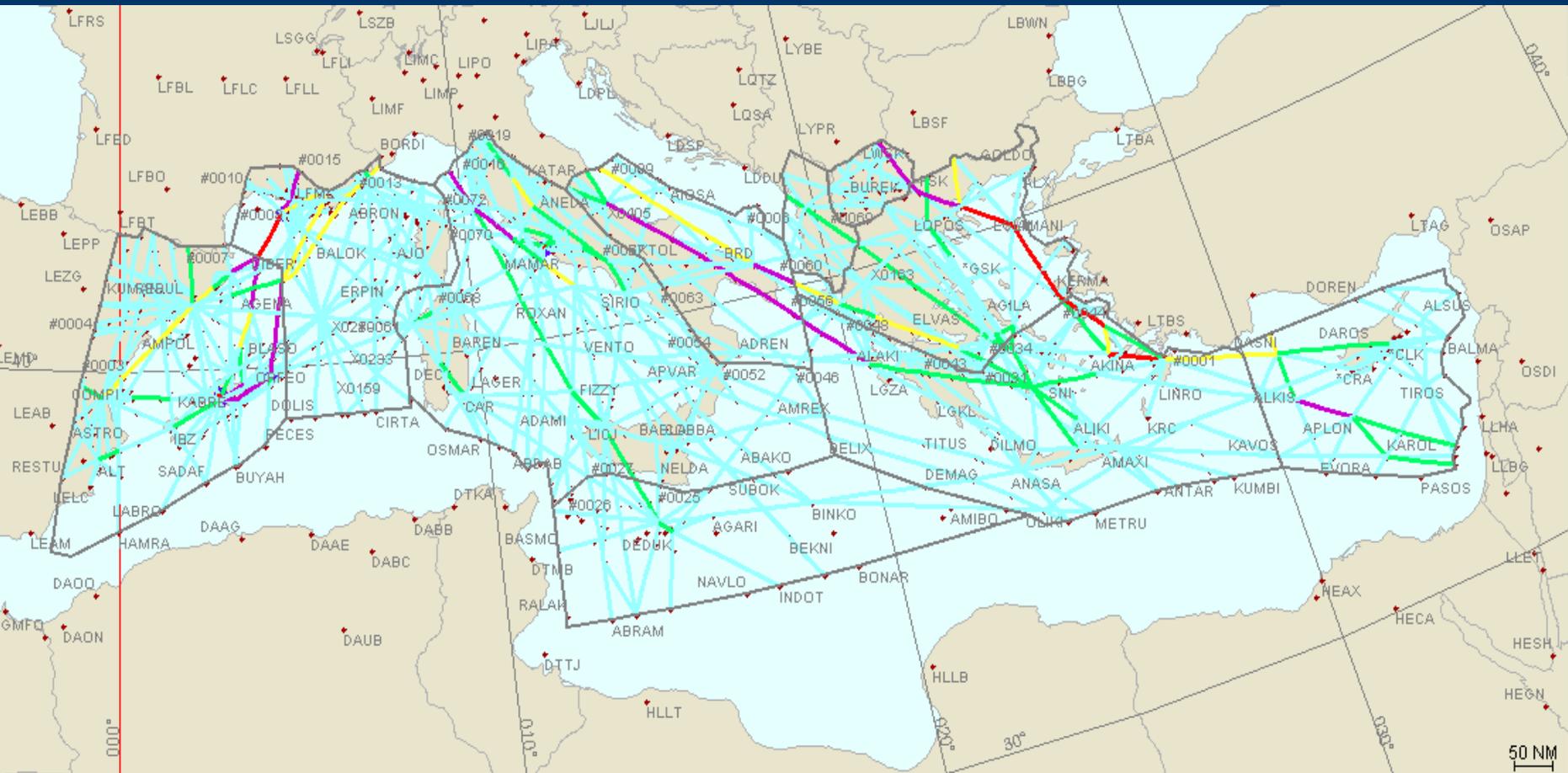
DISTRIBUTION OF TRAFFIC ON THE ACTUAL ROUTE NETWORK

Flights/Day



2010





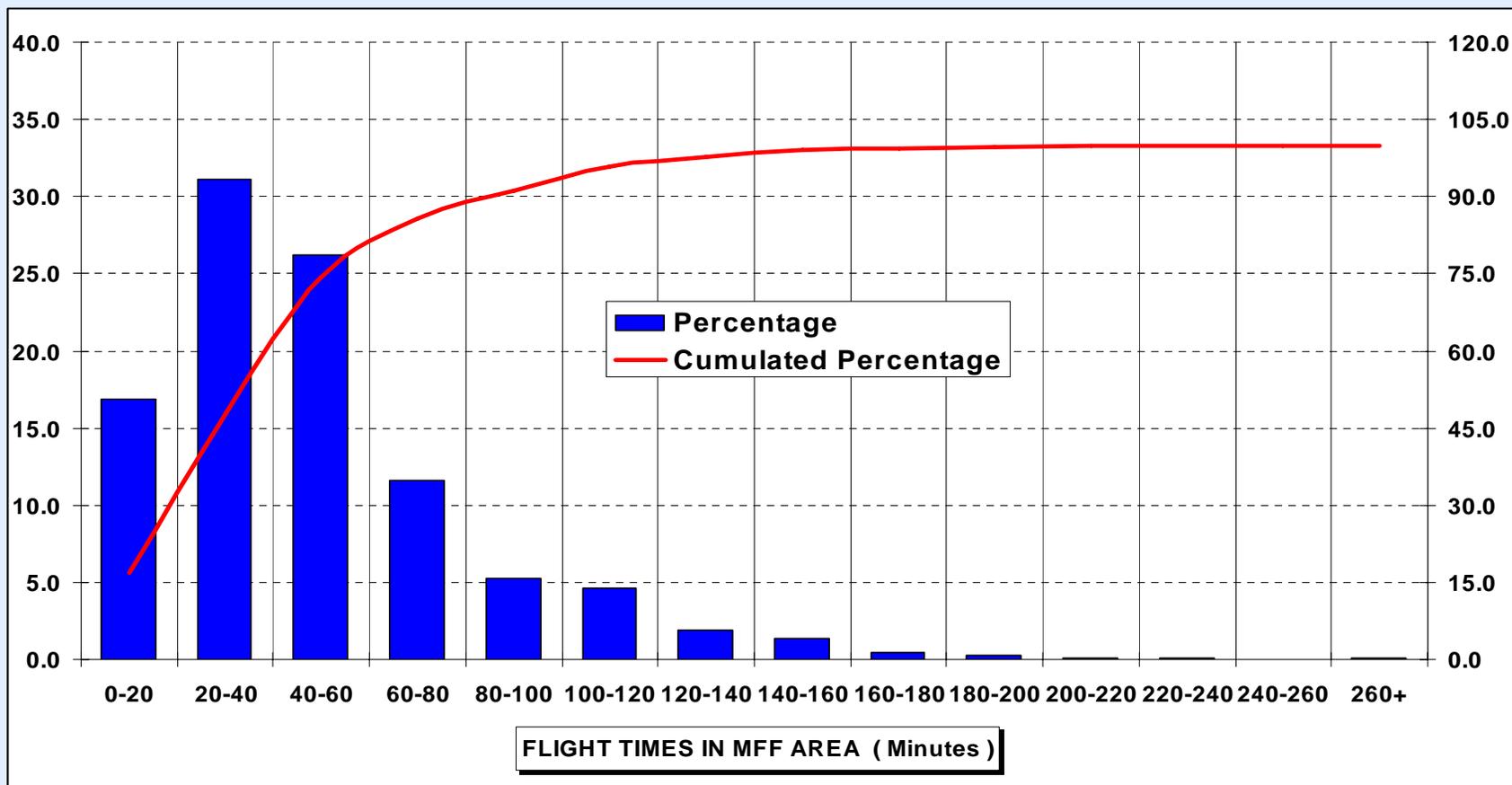
DISTRIBUTION OF THE 2751 ADDED FLIGHTS

FAA Tech Centre 8 Nov 2005

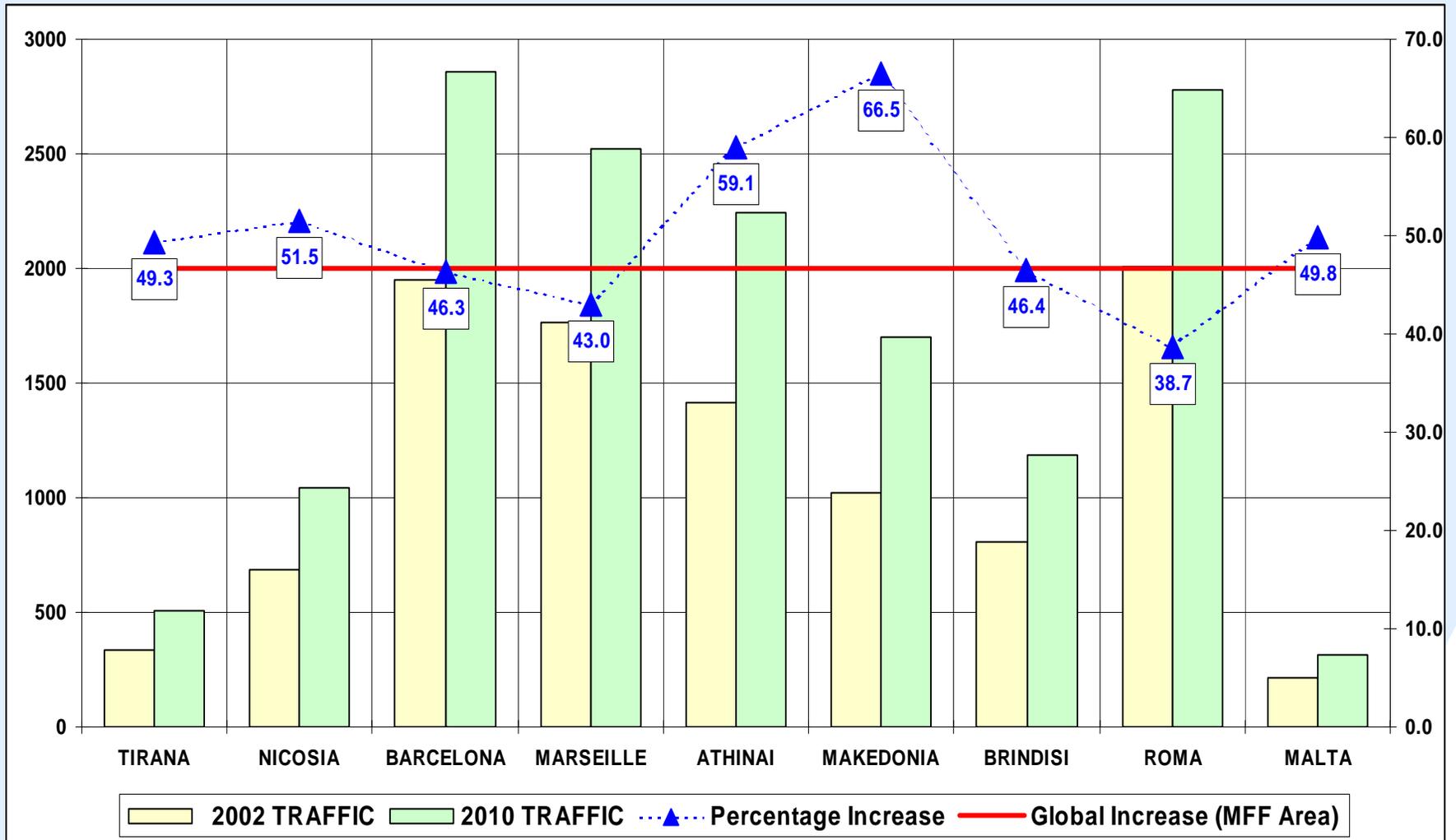


Analysing results

DISTRIBUTION OF FLIGHT TIMES IN THE AREA (2010 Traffic)

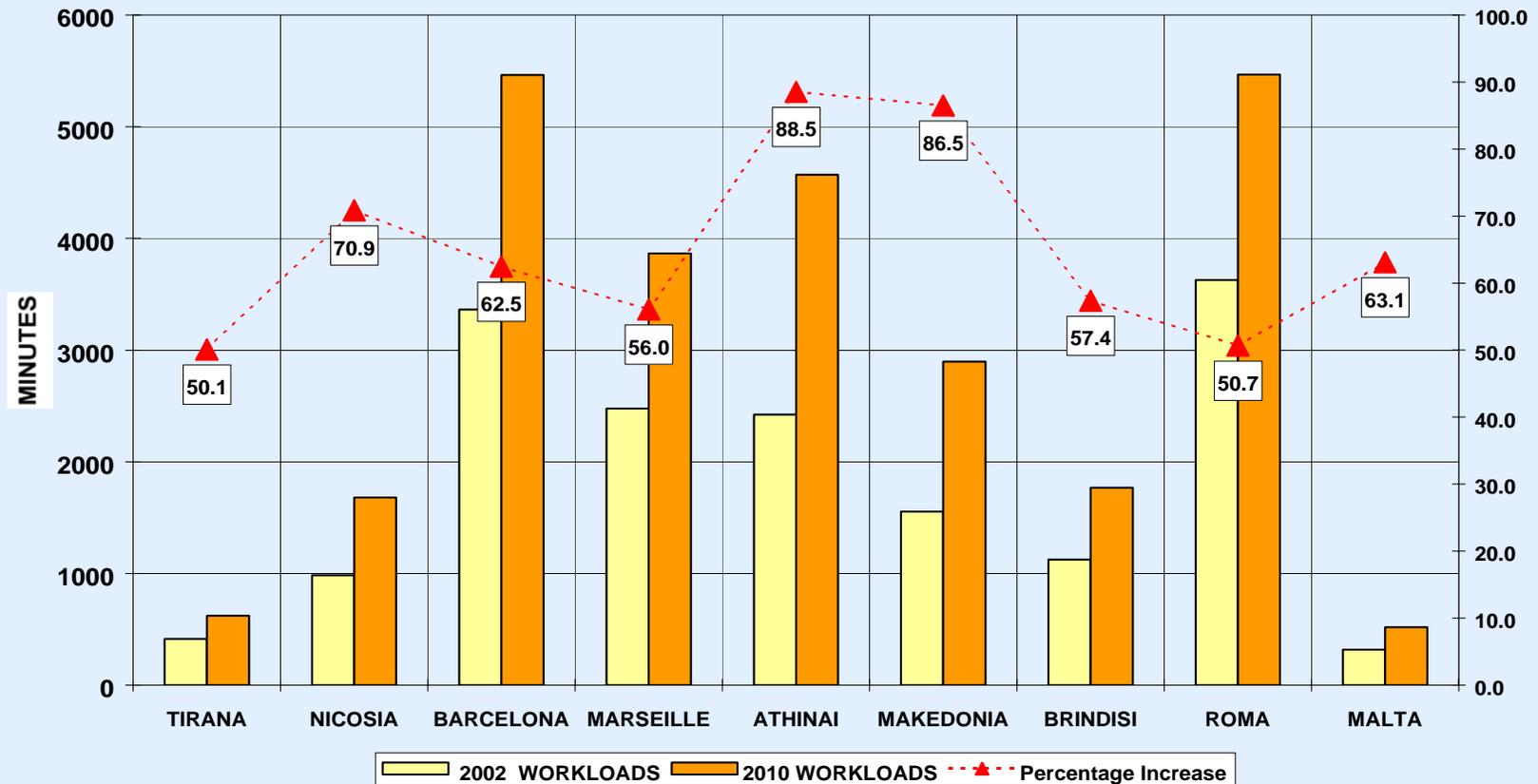


EVOLUTION OF TRAFFIC LOADS BY ACC between 2002 -and 2010

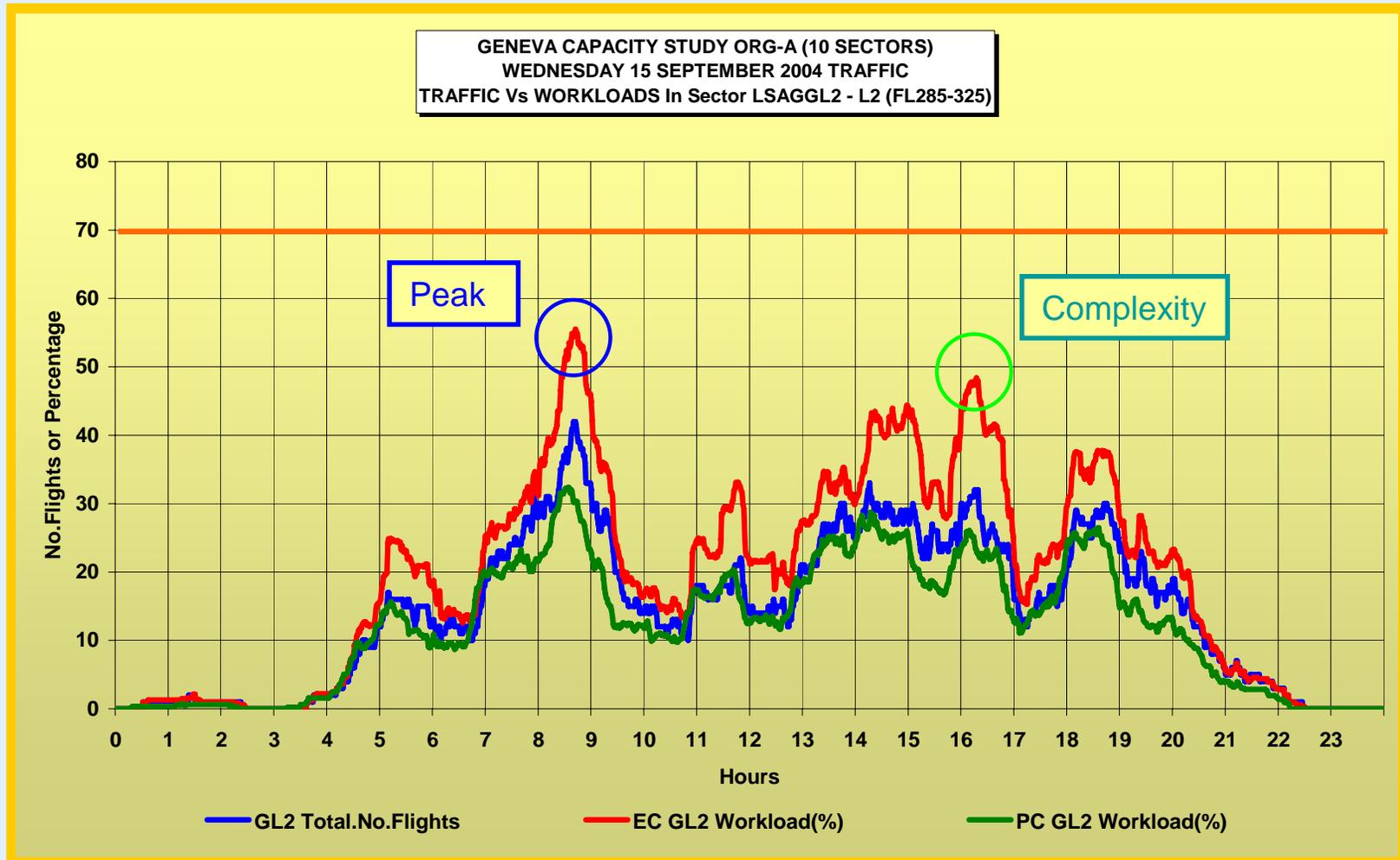


EVOLUTION OF GLOBAL ACC WORKLOADS (2002 to 2010)

(does not reflect the real ACC workloads, as the whole ACC was considered as one sector)



Complexity



Concluding remarks

- Modelling can be
 - Key to new concepts developed and getting changes implemented
 - Very helpful in helping planners understand their own concepts better
 - Useful in providing quantified data for decision making
 - FUN

- Always but always
- think before you simulate