ECONOMIC ANALYSES
&
DATABASES

Outline

- ICAO EAD Programme
- DATA and Analysis, The Key to Survive and Thrive.
- Best Practices to collect and analyze management data.
- Need for common taxonomy
- Risks and Proposed Mitigation steps
- MIS and Management reports for HLI's.
- Safety Analysis

ICAO EAD Programme

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ICAO EAD Programme

Why do we need Data

- Plan regional air navigation facilities
- Monitor air travel safety rates
- Assess the impact of new regulations
- Monitor the impact of air transport on the environment

ICAO EAD Programme

Why (cont.)

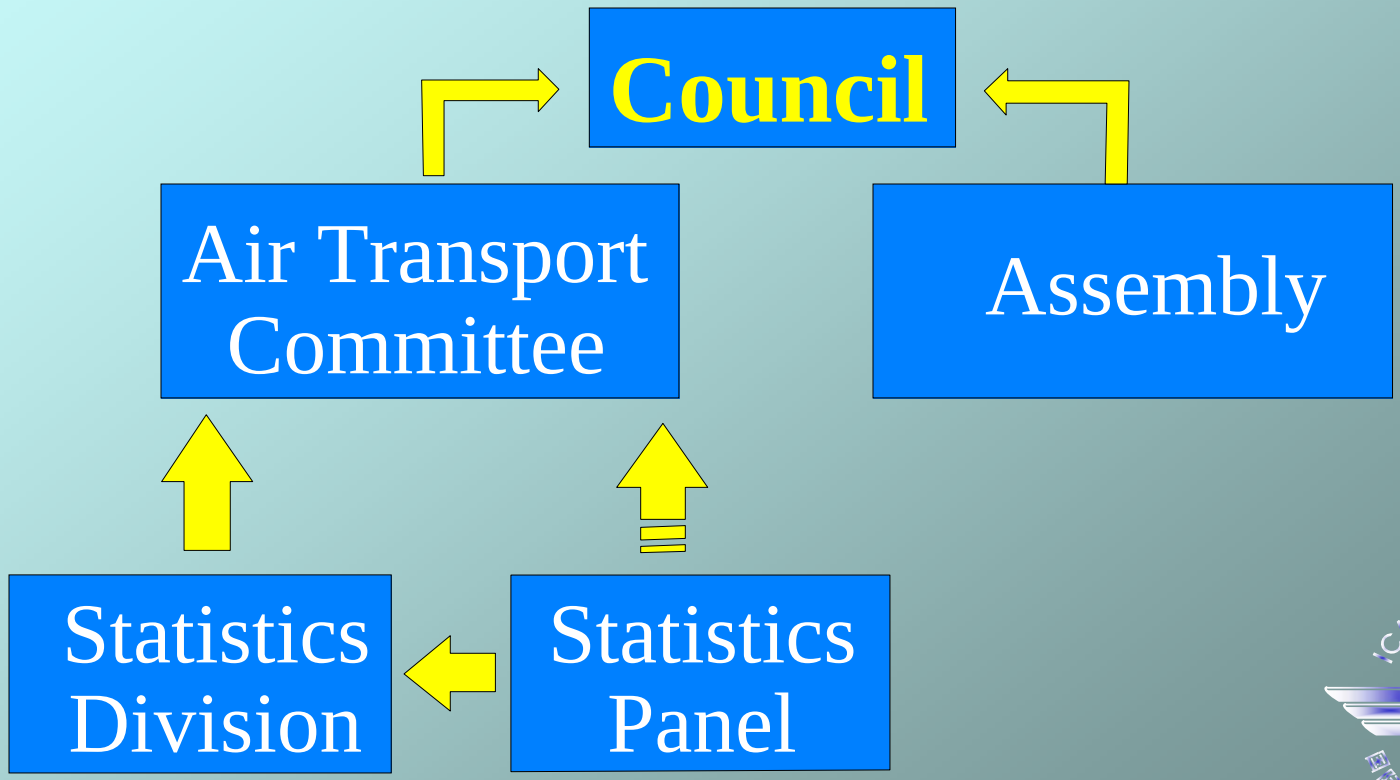
- Monitor the development of autonomous airport and air navigation service entities
- Monitor the economic development of air transport
- Rank airports for security audits
- Calculate the individual financial contribution of States to ICAO

ICAO EAD Programme

Basis

- Chicago Convention (Art. 54, 55, and 67)
  - 😐 Art. 67 establishes the obligation of contracting States to submit airline traffic and financial data to ICAO
- Assembly Resolutions (A35-18, App. B)
- Council decisions

ICAO EAD Programme



ICAO EAD Programme

Commercial air carriers

- Traffic
- On-flight Origin and Destination (OFOD)
- Traffic by Flight Stage (TFS)
- Fleet and Personnel
- Financial data

ICAO EAD Programme

Airports and Air navigation services

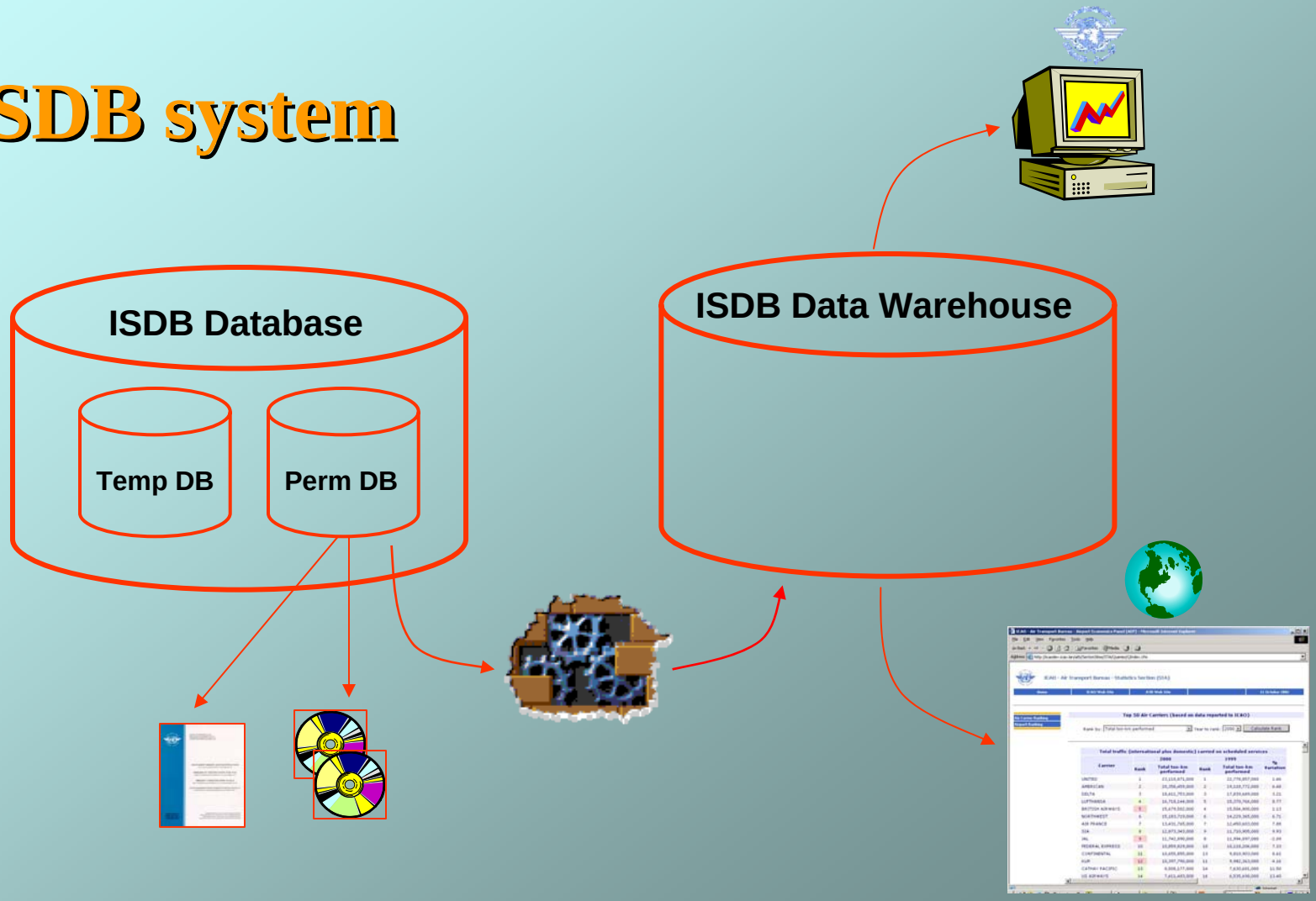
- Traffic
- Financial data

Civil aircraft on Register

http://www.icao.int/icao/en/atb/ead/index.html

Integrated Statistics Database

The ISDB system



On-line data dissemination

On-line data dissemination

Forecasting

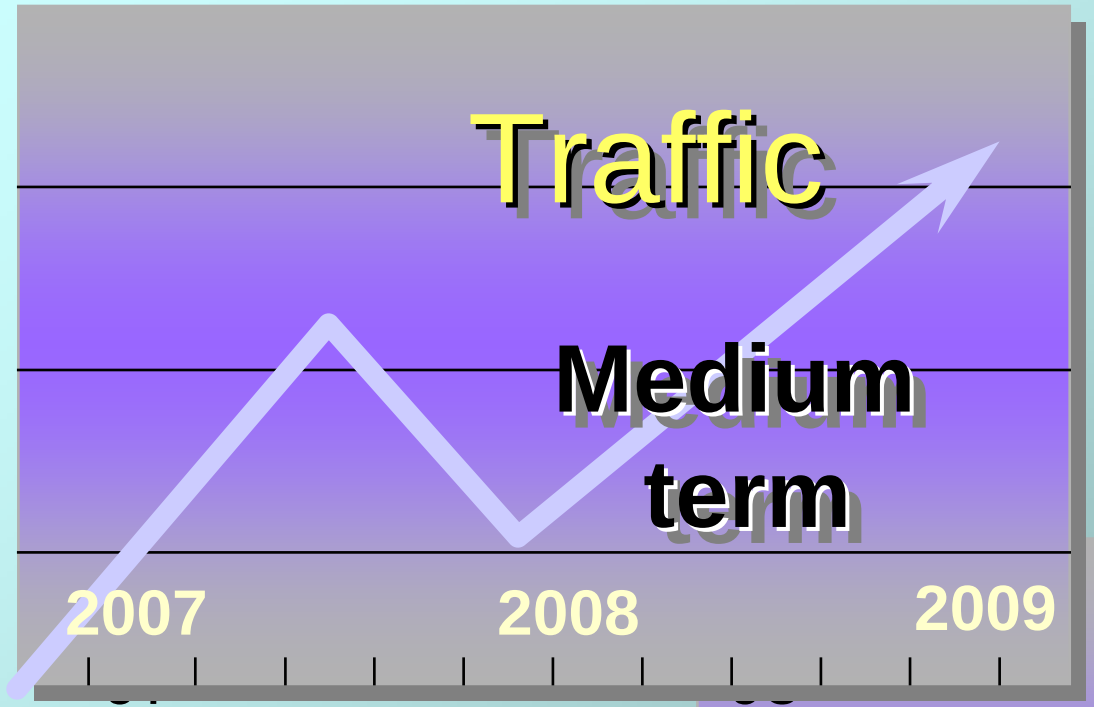
Long-term & Medium-term Forecasts

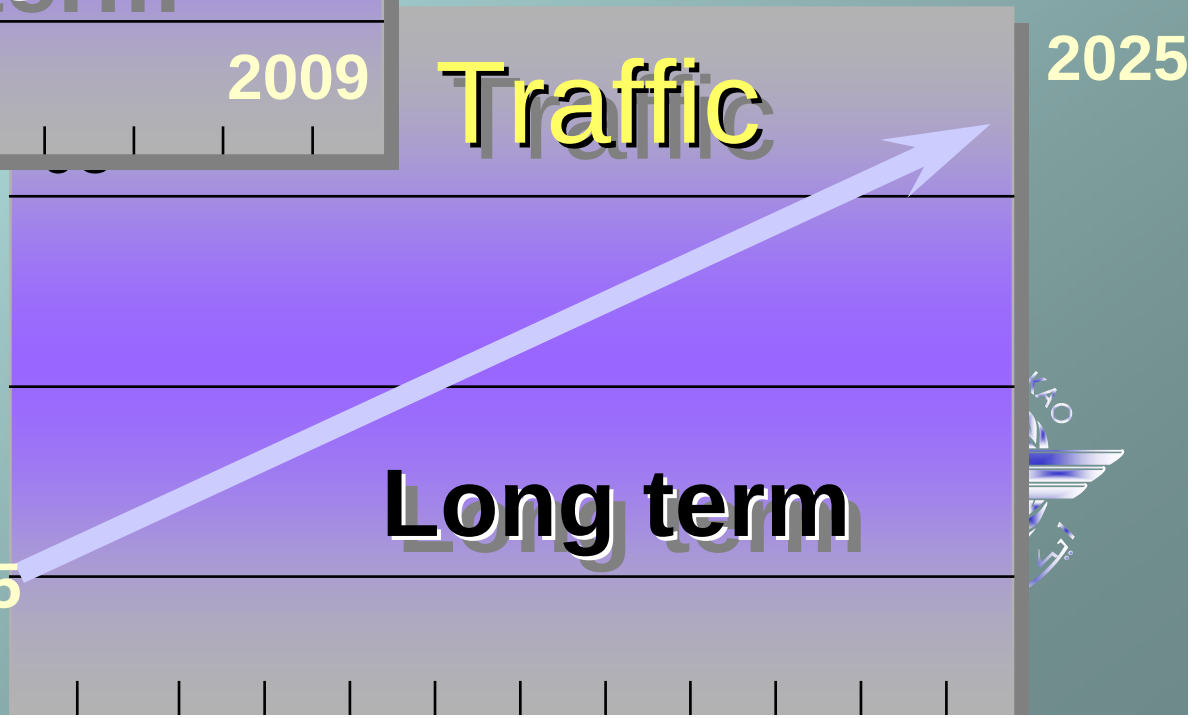
Route Group Forecasts

Basis for ICAO Forecasting Activities

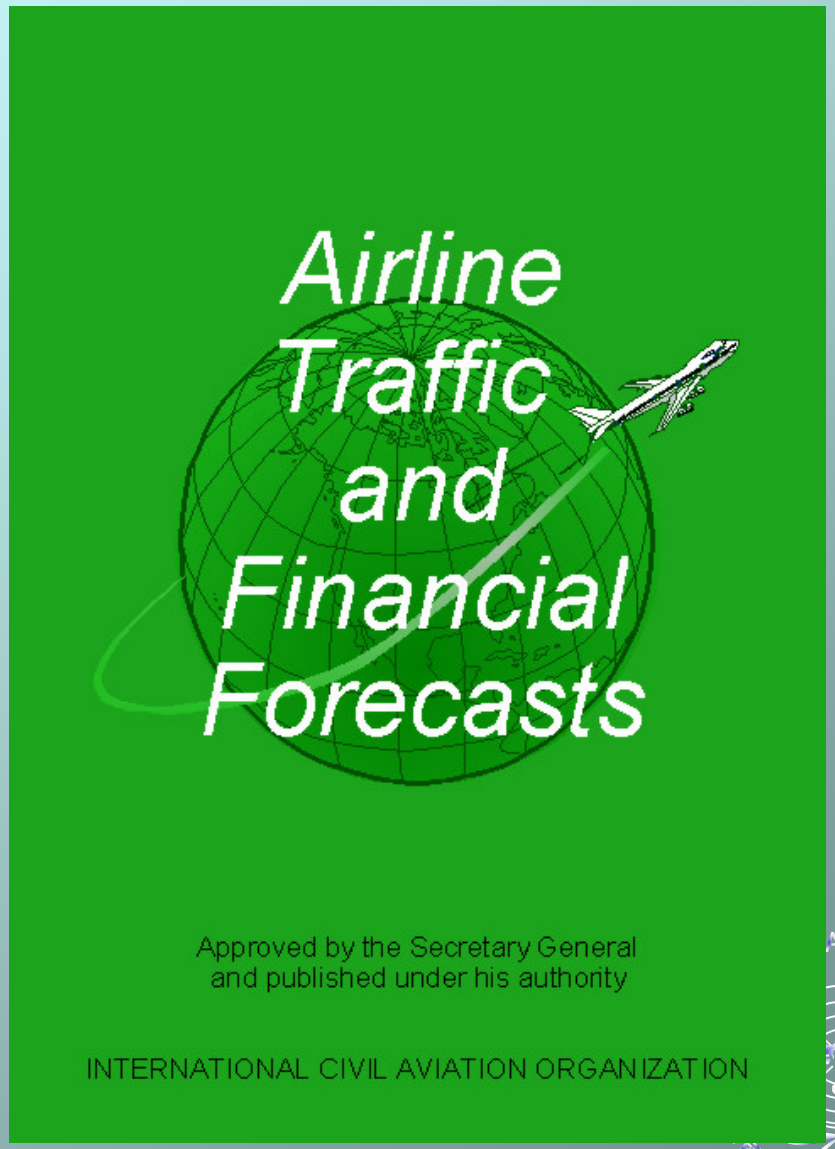
- Assembly Resolution A36-15, Appendix C
  - prepare and maintain long-term and medium-term forecasts
  - develop methodologies and procedures
  - collect and develop material on current forecasting methods

Forecasts


Traffic
Medium term
2007
2008
2009


Traffic
Long term
2005
2025

Medium-term Forecasts



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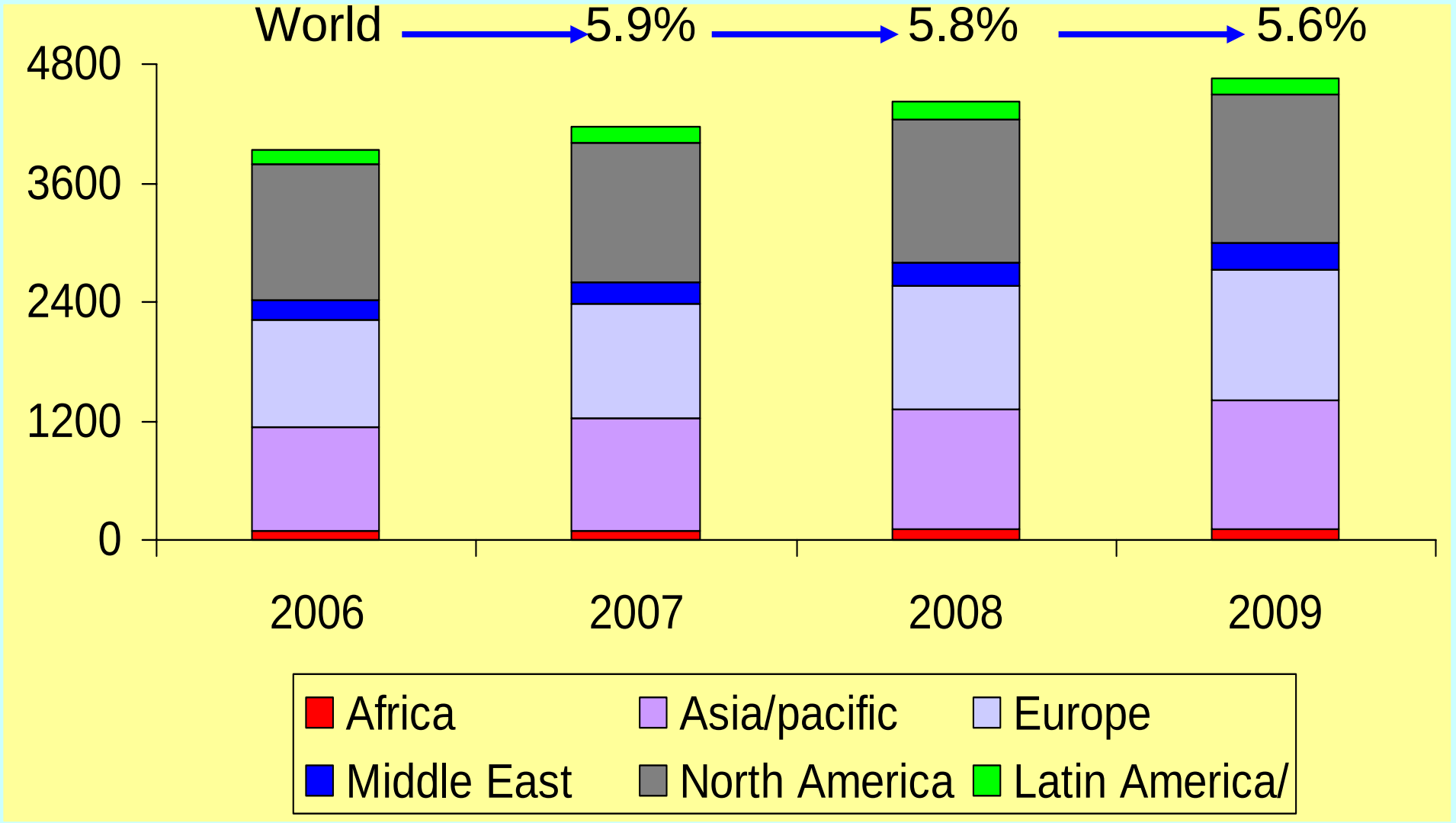
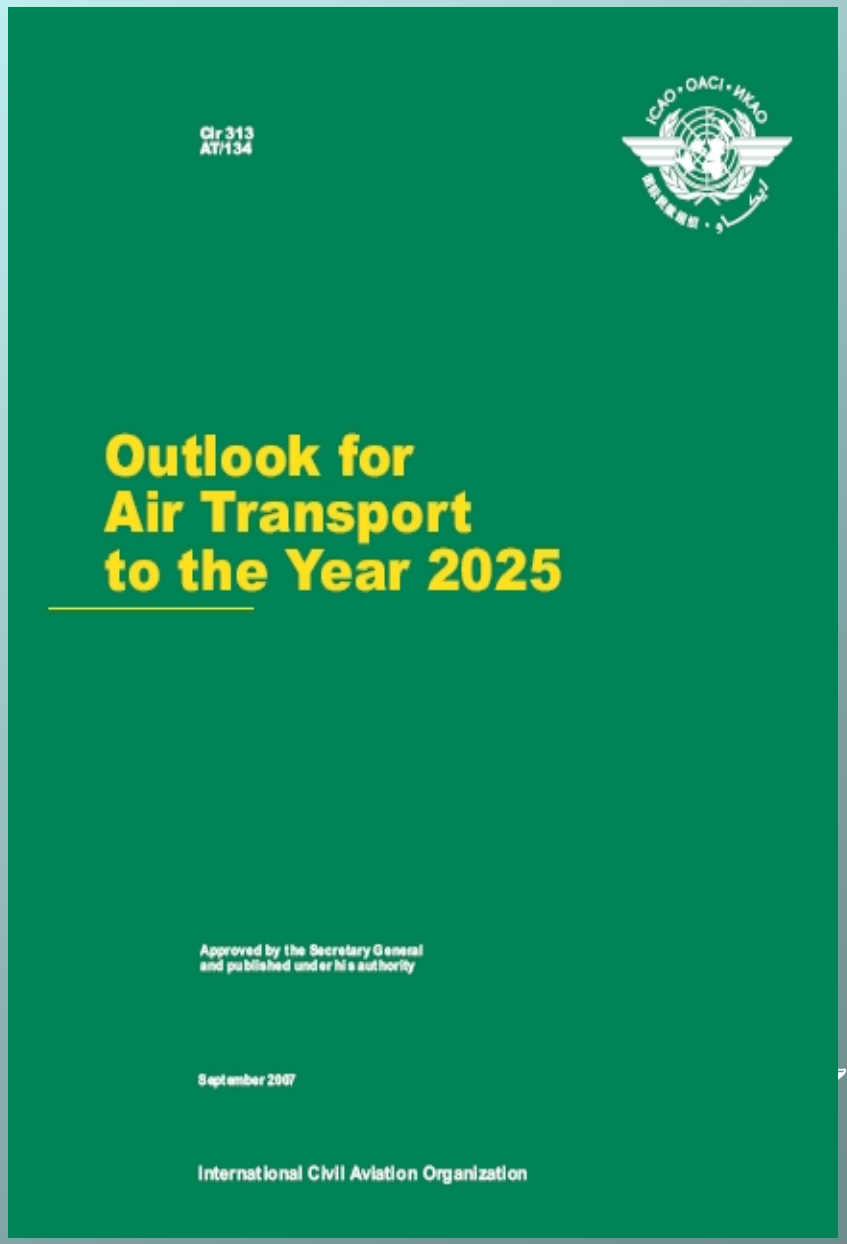
ICAO Medium Term Forecast (RPK)
2007 - 2009



Long-term traffic forecasts



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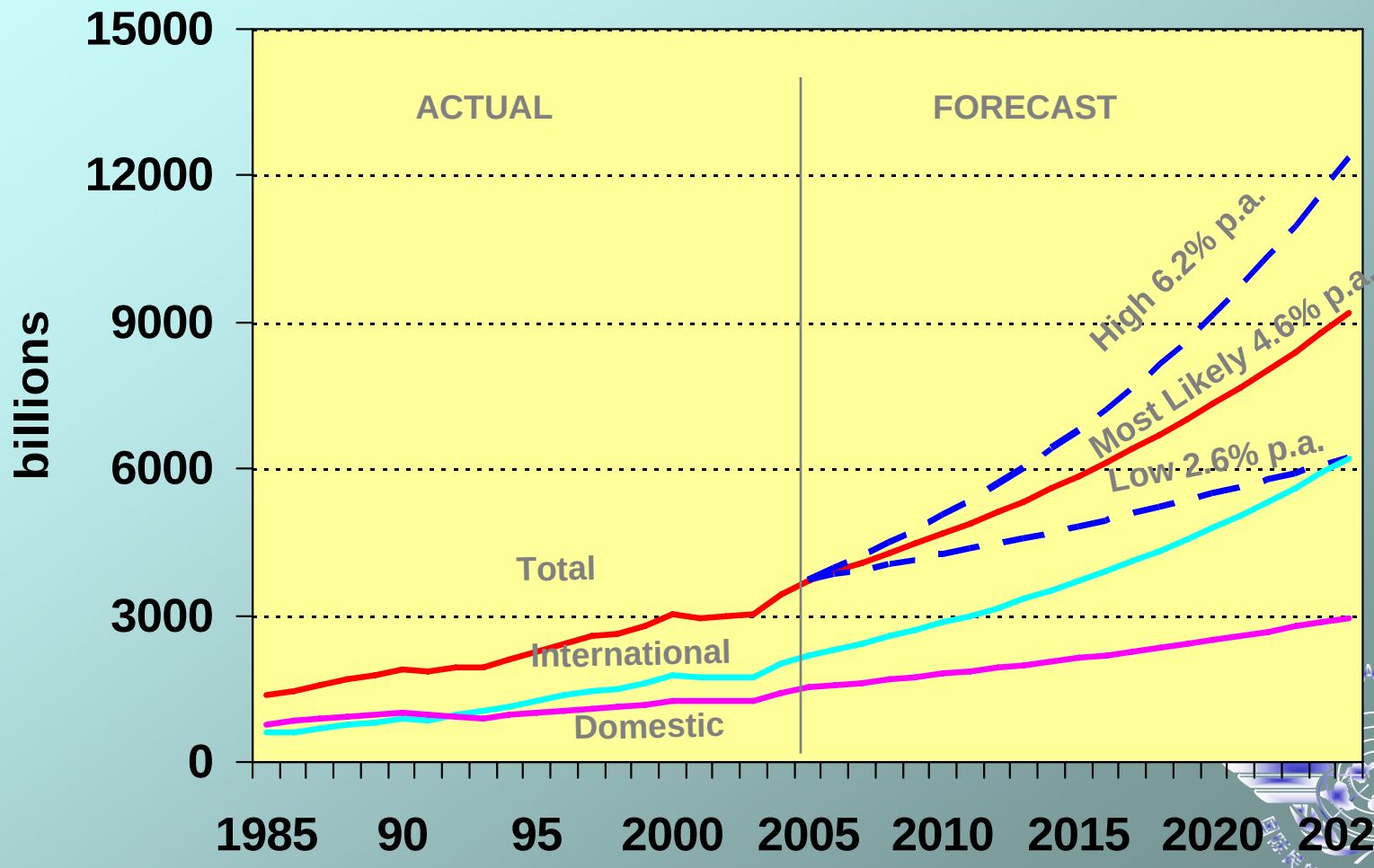
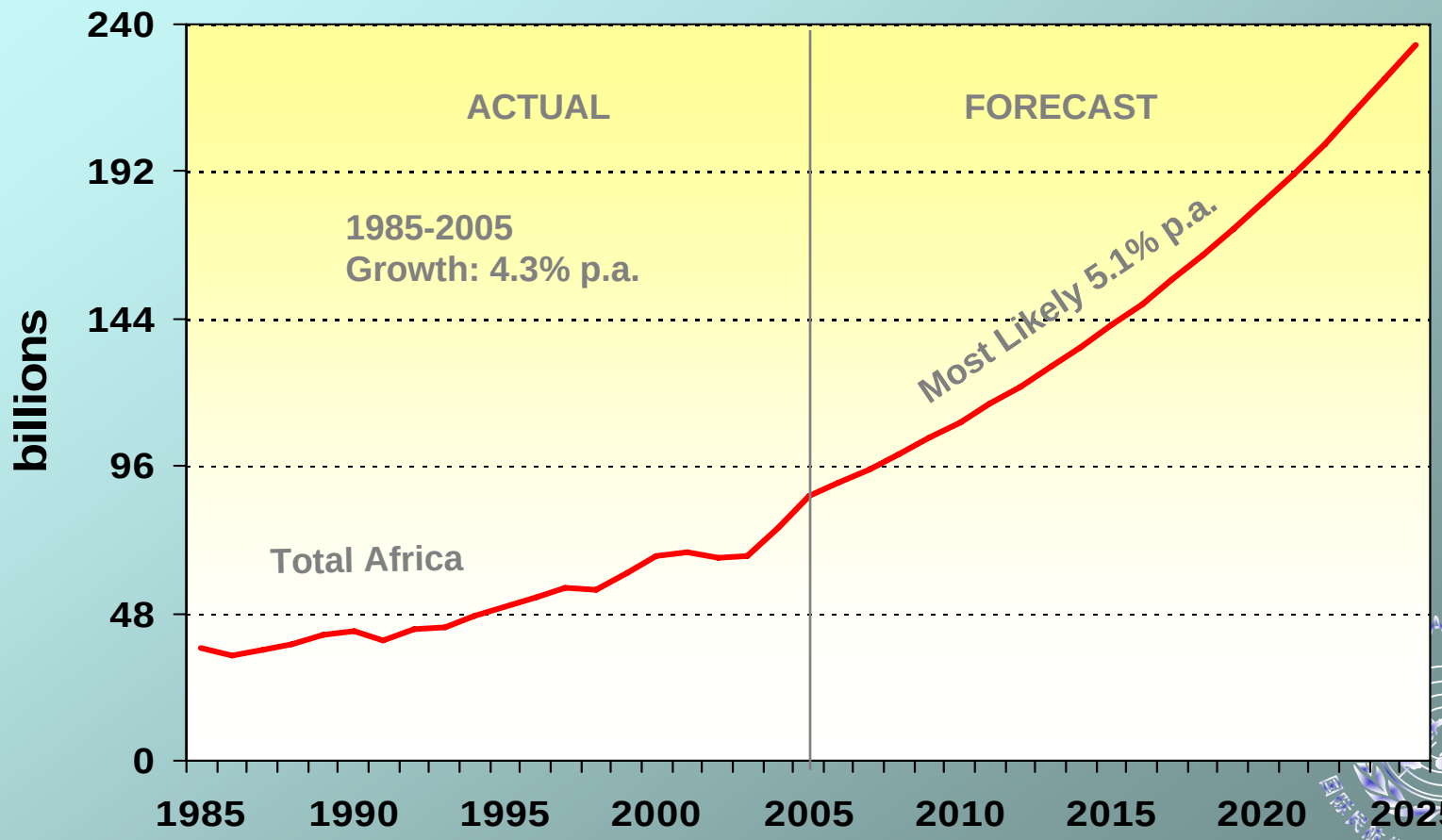
ICAO Long-term World Scheduled RPK Forecast, 2005 - 2025



RPK = Revenue Passenger-kilometres

ICAO Long-term Scheduled RPK Forecast, Africa, 2005 - 2025



RPK = Revenue Passenger-kilometres

Forecast of Scheduled Passenger Traffic on Route Groups To/From and Within Africa 2004–2020

Route Group	Passengers Carried (Thousands)			Average Annual Growth (Per Cent)		
				Forecast		
	2004	2010	2020	2004-10	2010-20	2004-20
Africa-Europe	23 170	30 700	46 800	4.8	4.3	4.5
Intra-Africa	5 970	10 600	24 150	10.0	8.6	9.1
Africa-Middle East	6 520	9 700	18 500	6.8	6.7	6.7
Africa-Asia/pacific	1 860	2 500	3 800	5.1	4.3	4.6
Africa-North America	720	1 060	1 900	6.7	6.0	6.3
Total	38 240	54 560	95 150	6.1	5.7	5.8

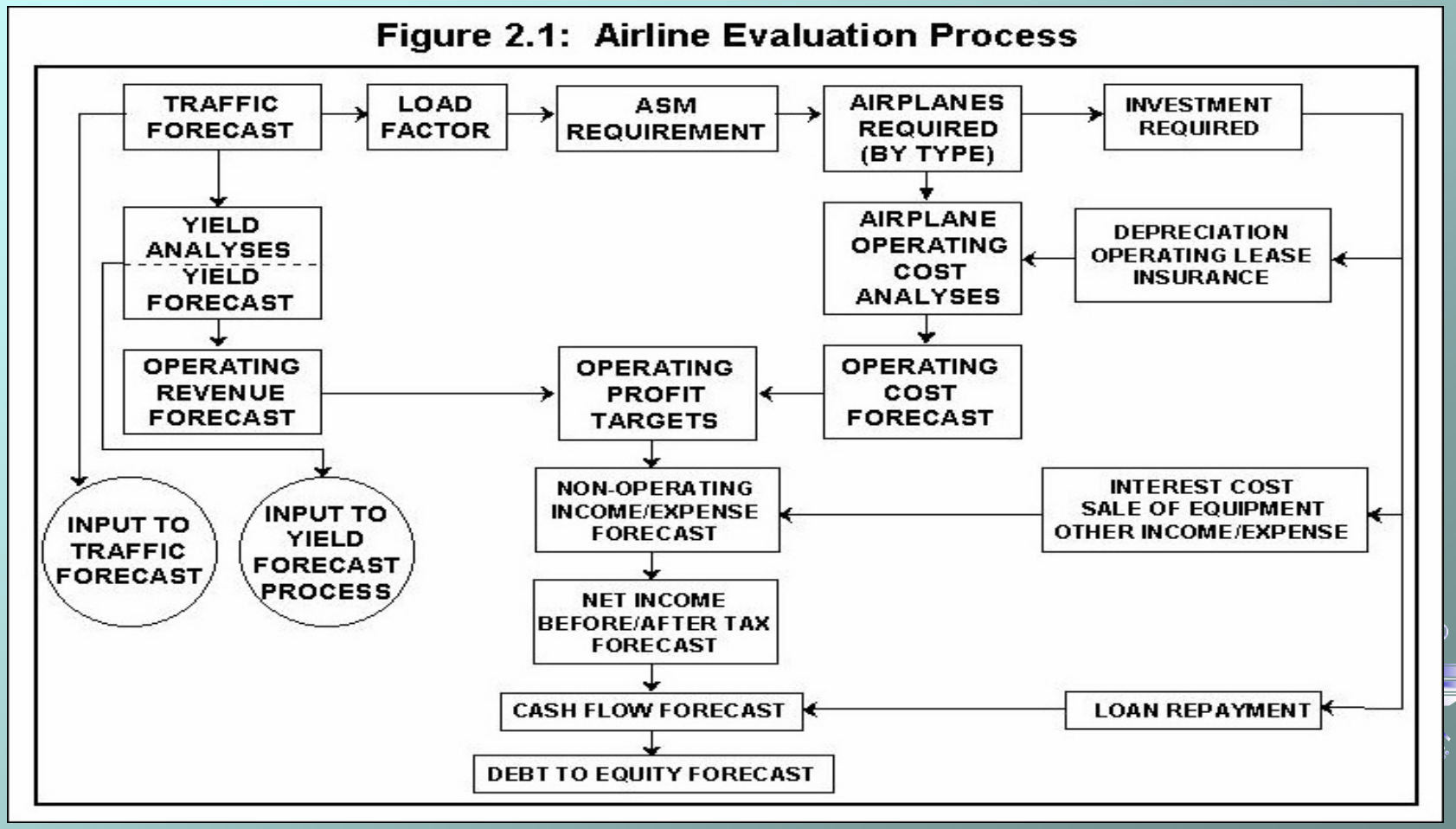
Source: Report of the Africa-Indian Ocean Traffic Forecasting Group (AFI TFG), February 2006.

DATA & ANALYSIS

DATA – COLLECT AND ANALYZE

- Fleet Planning.
- Financing
- Route Profitability and Viability
- Benchmarking , Ascertaining and Improving Competitiveness – Smart Decision Making
- Safety Analysis – Reduce Accident Rates.
- Regulatory policy impact
- Environmental Impact

Fleet planning – Evaluation process



DATA – WHAT TO COLLECT ?

- Operational data collection – Physical characteristics of Aircraft operations.
- Financial data collection – Accounting data.
- Integrate Operational and Financial Data
- Study, Analyze and Decide.

Source for Operational and Financial Data

- For operational data, the initial source is the planned schedules to be compared with actual Pilot reports to record variances and determine the actual operations.
- For financial data the source is the raw accounting data received from online and offline stations and centralized at the Central Accounting office.
- The raw operational and accounting data is compiled into set templates by the MIS Division to generate value added Reports for decision making by the Management.

Operational Data

- Tells us what capacity was actually offered and how much was utilized by aircraft type on each City Pair. Summation will provide us Route performance data and Holistic Data.
- Key data to gauge capacity utilization by time. Ideal for Benchmarking with Competitors data, to ascertain Trends and Market shares vs. Frequency Shares.

Operational Data collection

ROUTE INDIA/USA

OPERATIONAL STATISTICS

Date	Fltno	Sector	Acft	Kms	Hrs	Payload	Seats Y	Seats F	Seats Total	ASK(000) Y	ASK(000) F	ASK(000) Total	ATKM (000)	Speed
1-May	111	BOM LON	B747-400	7213	8.15	110	400	80	480	2885.2	577.04	3462.24	793.43	885
1-May	111	LON NYC	B747-400	5537	6.22	110	400	80	480	2214.8	442.96	2657.76	609.07	890
1-May	111	BOM LON NYC	B747-400	12750	14.37	110	400	80	480	5100	1020	6120	1402.5	887

Date	Fltno	Sector	Acft	Kms	Hrs	Payload	Seats Y	Seats F	Seats Total	ASK(000) Y	ASK(000) F	ASK(000) Total	ATKM (000)	Speed
3-May	333	BOM LON	B747-400	7213	8.2	110	400	80	480	2885.2	577.04	3462.24	793.43	880
3-May	333	LON NYC	B747-400	5537	6.1	110	400	80	480	2214.8	442.96	2657.76	609.07	908
3-May	333	BOM LON NYC	B747-400	12750	14.3	110	400	80	480	5100	1020	6120	1402.5	892

Date	Fltno	Sector	Acft	Kms	Hrs	Payload	Seats Y	Seats F	Seats Total	ASK(000) Y	ASK(000) F	ASK(000) Total	ATKM (000)	Speed
5-May	555	BOM FRA	B747-400	6567	8.3	110	400	80	480	2626.8	525.36	3152.16	722.37	791
5-May	555	FRA CHI	B747-400	6965	6.5	110	400	80	480	2786	557.2	3343.2	766.15	1072
5-May	555	BOM FRA CHI	B747-400	13532	14.8	110	400	80	480	5412.8	1082.56	6495.36	1488.52	914

W1 May	TOTAL	IND/USA	B747-400	39032	43.47	330	1200	240	1440	15612.8	3122.56	18735.36	4293.52	898

TRAFFIC STATISTICS (Ticket coupon data)

Date	Fltno	Sector	Paxnos Y	Paxnos F	Paxnos Total	PKM(000) Y	PKM(000) F	PKM(000) Total	PTK(000) Y	PTK(000) F	PTK(000) Total	Frttons Total	Mailtons Total	FTK(000) Total	MTK(000) Total	RTK(000) Total
1-May	111	BOM LON	100	20	120	721.3	144.26	865.56	64.917	14.426	79.343	20	5	144	36	260
1-May	111	LON NYC	200	10	210	1107.4	55.37	1162.77	99.666	5.537	105.203	10	0	55	0	161
1-May	111	BOM NYC	180	50	230	2295	637.5	2932.5	206.55	63.75	270.3	10	10	128	128	525
1-May	111	BOM LON NYC	480	80	560	4123.7	837.13	4960.83	371.133	83.713	454.846	40	15	327.13	163.565	945.541

Date	Fltno	Sector	Paxnos Y	Paxnos F	Paxnos Total	PKM(000) Y	PKM(000) F	PKM(000) Total	PTK(000) Y	PTK(000) F	PTK(000) Total	Frttons Total	Mailtons Total	FTK(000) Total	MTK(000) Total	RTK(000) Total
3-May	333	BOM LON	110	20	130	793.43	144.26	937.69	71.4087	14.426	85.8347	20	5	144	36	266
3-May	333	LON NYC	190	10	200	1052.03	55.37	1107.4	94.6827	5.537	100.2197	10	0	55	0	156
3-May	333	BOM NYC	170	50	220	2167.5	637.5	2805	195.075	63.75	258.825	15	10	191	128	578
3-May	111	BOM LON NYC	470	80	550	4012.96	837.13	4850.09	361.1664	83.713	444.8794	45	15	390.88	163.565	999.3244

Date	Fltno	Sector	Paxnos Y	Paxnos F	Paxnos Total	PKM(000) Y	PKM(000) F	PKM(000) Total	PTK(000) Y	PTK(000) F	PTK(000) Total	Frttons Total	Mailtons Total	FTK(000) Total	MTK(000) Total	RTK(000) Total
5-May	555	BOM FRA	120	25	145	788.04	164.175	952.215	70.9236	16.4175	87.3411	20	5	131	33	252
5-May	555	FRA CHI	180	5	185	1253.7	34.825	1288.525	112.833	3.4825	116.3155	10	0	70	0	186
5-May	555	BOM CHI	190	45	235	2571.08	608.94	3180.02	231.3972	60.894	292.2912	20	10	271	135	698
5-May	555	BOM FRA CHI	490	75	565	4612.82	807.94	5420.76	415.1538	80.794	495.9478	50	15	471.63	168.155	1135.733

W1 May	TOTAL	IND/USA	1440	235	1675	12749.48	2482.2	15231.68	1147.453	248.22	1395.673	135	45	1189.64	495.285	3080.598

Note - (1) The BOM NYC traffic will be added to BOM LON and LON NYC traffic while BOM CHI traffic to BOM FRA and FRA CHI traffic for flight stage analysis.

Note - (2) The similar statistics to be compiled for the return flights (USA INDIA) and summing it will give the operational and traffic statistics for the IND USA IND route.

Financial Data

- Account for financial data as per recommended and adopted accounting Standards.
- Allocate variable costs and operating revenues across identified aircraft and routes.
- Allocate indirect costs across routes by aircraft type using standard costing principles.
- Integrate the accounting data with operational data by Route and aircraft type to determine Route profitability and viability.

Route Profitability and Viability

747-300

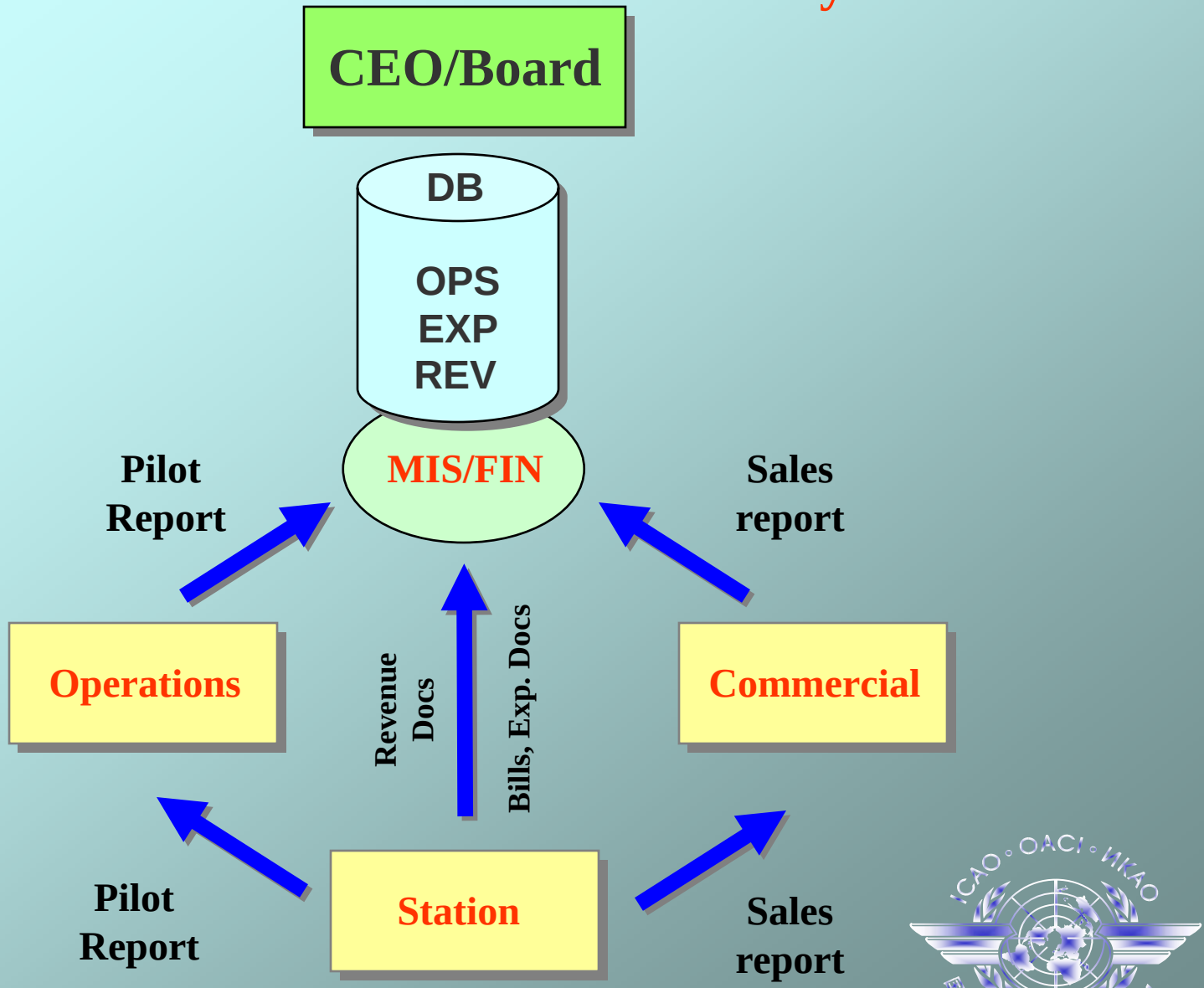
	Gulf	Continent	Japan	USA	Total
Flt Number/Date					
Revenue Hours					
Atkm					
Askm					
Rtkm					
Pkm					
No of revenue passengers					
Revenue before pool					
Pool receipts/(payments)					
Revenue after pool (A)					
Load factors					
Passenger					
Overall					
Break even					
CASH COSTS					
Landing fees					
Navigation charges					
Handling charges					
Fuel and oil					
Crew expenses					
Passenger Amenities					
Legal Liability					
Booking agency commission					
Material consumption incl repairs					
Hire of aircraft					
TOTAL CASH COSTS (B)					
CASH CONTRIBUTION (A-B)					
OTHER FIXED COSTS (DIRECT)					
Op & Cabin crew salaries					
Eng. and Stores salaries					
Eng dept staff costs					
Insurance aircaft					
Depreciation/Amort. Aircraft					
Obsolescence on spares					
Lease rentals					
OTHER DIRECT COSTS (C)					
TOTAL DIRECT COSTS (B+C) = D					
INDIRECT COSTS					
Publicity					
Salaries other than crew and Eng					
System Overheads					
Depreciation other than aircarft					
TOTAL INDIRCT COSTS (E)					
TOTAL OPERATING COSTS (D+E) = F					
Credit for handling/servicing (G)					
Net Operating costs (F-G) = H					
Operating Profit/(Loss) (A-H)					

Best Practices to Collect and Analyze Data

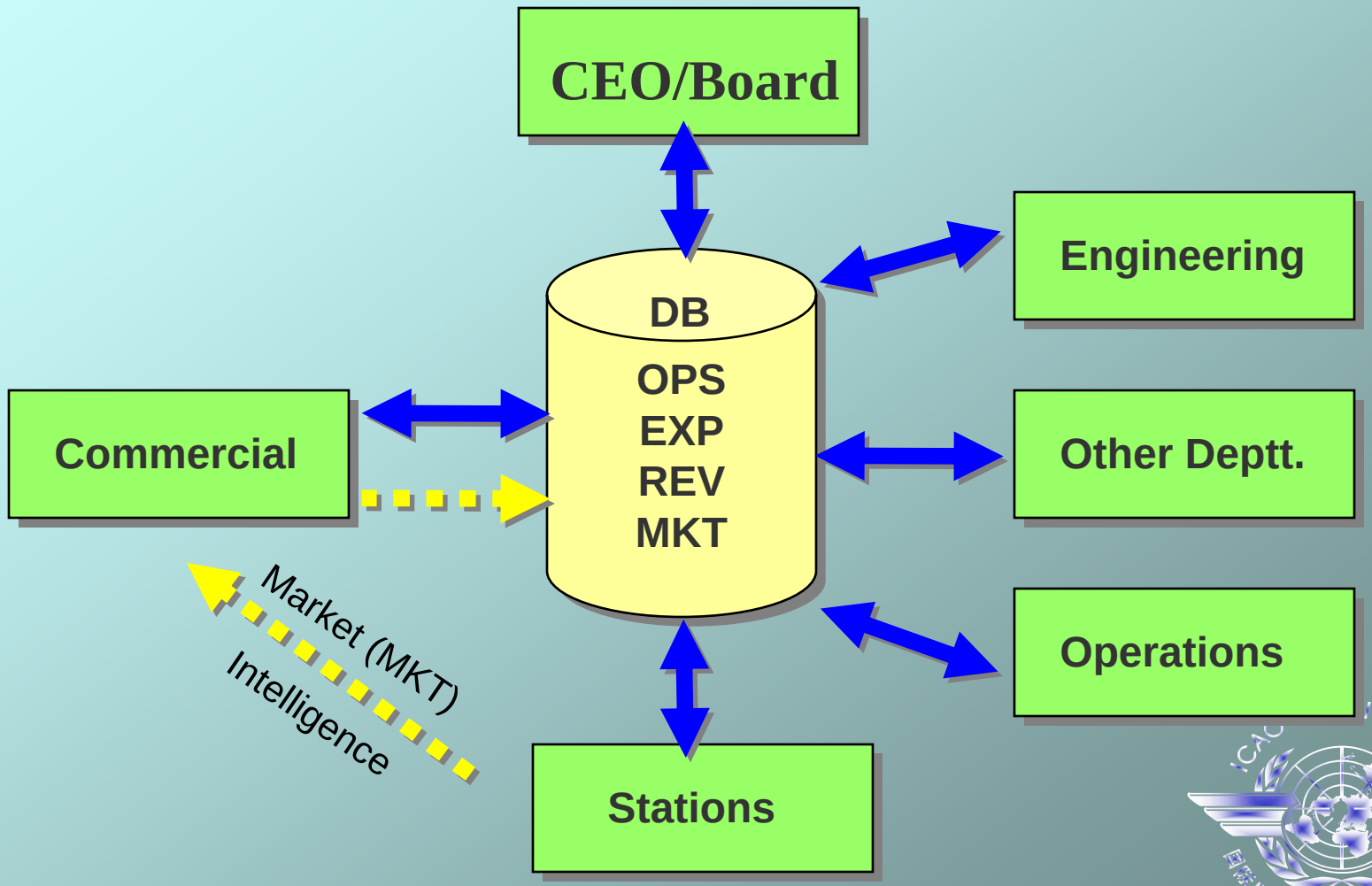
Best Practices to collect and analyze Data

- Create a MIS Division Reporting to the CEO through the Director Finance.
- The MIS Division staffed by officers adept in accounting and analysis.
- The MIS Division creates a template of operational data and financial data to be collected on a periodic basis.
- Generates periodic reports and observations to the CEO and the Board thru the Director Finance.
- ICAO Data series could be a Start.

Best Practices to collect and Analyze Data



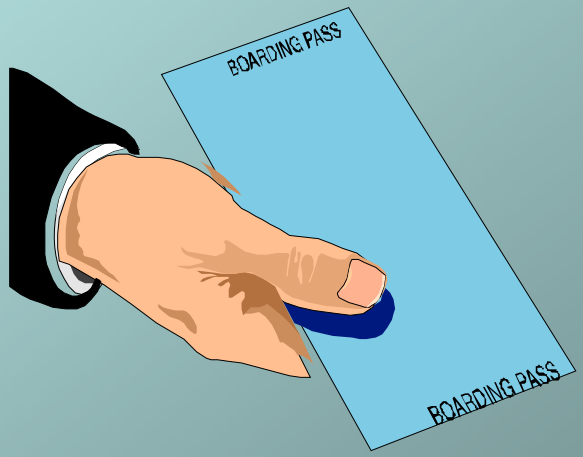
Best Practices to collect and Analyze Data



Need for Common Taxonomies

A passenger

Simplest definition



1 Passenger = 1 coupon

Revenue passenger

- All passengers carried for which the airline receives remuneration

Revenue passenger (cont.)

This definition includes, for example,

a) passengers traveling under publicly available promotional offers or loyalty programmes

b) passengers traveling as compensation for denied boarding;

c) passengers traveling on corporate discounts;

d) passengers traveling on preferential fares (government, military, youth, student, etc.).

Revenue passenger (cont.)

This definition excludes, for example,

a) persons traveling free;

b) persons traveling at a fare or discount available only to employees of air carriers or their agents or only for travel on business for the carriers;

c) infants who do not occupy a seat

Domestic traffic

Flight stages flown within the national boundaries of a State by a carrier whose headquarter is in the same State

Passengers carried

LGA → Flight coupon → **PTY**

Flight AA959

LGA → **MIA**

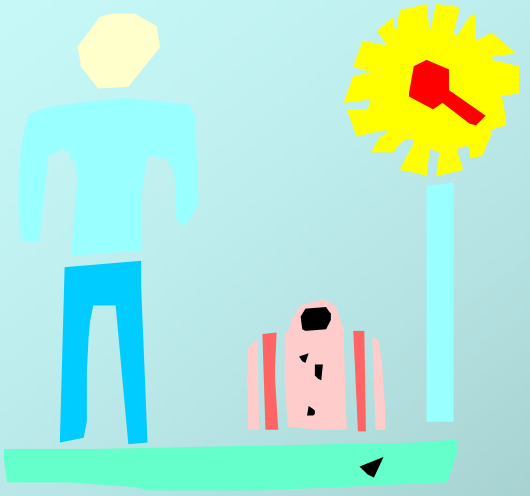
Domestic stage

MIA → **PTY**

International stage

1 OD Coupon = 1 international passenger

A passenger tonne-kilometre



Passenger +checked baggage = 90 kilogram

(Suggested weight)

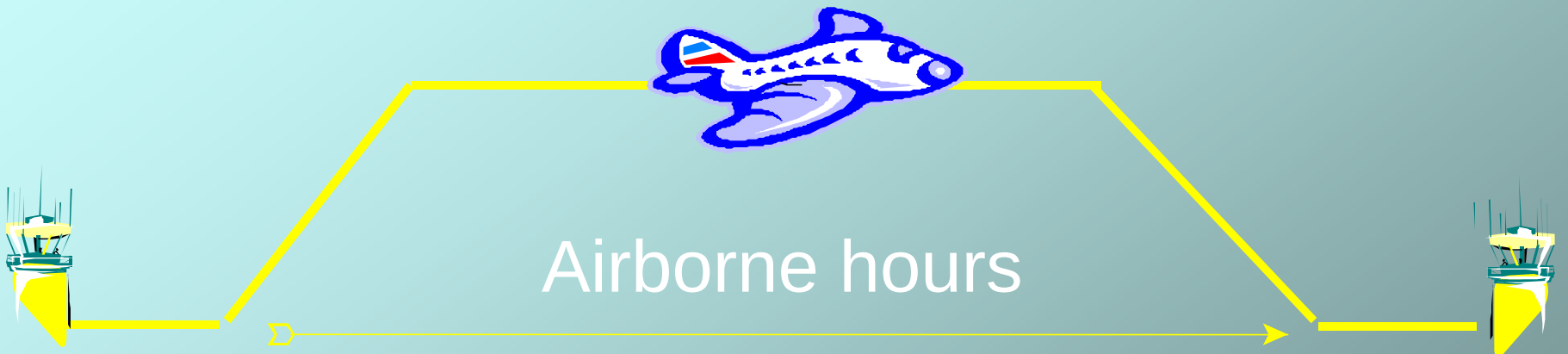
42 100 pass-km = 3 789 passenger tonne-kilometres

Total capacity available

It refers to the capacity available for sale taking into consideration:

- Payload restrictions
- Operational restrictions
- Marketing considerations

Flight hours



Block hours

Scheduled vs. non-scheduled

- Distinction very blurry in Europe and North America
- May distort annual growth figures
- In many other States distinction still exist
- Poor reporting of non-scheduled traffic
- Non-scheduled traffic difficult to estimate

Differences in Accounting

- Booking unused uplift coupons
  (FSA Account).
- Accounting of government taxes, surcharges, special discounts, overriding commission.
- Accounting of special Promotional fares.
- Accounting of loyalty programs, capital gains, sales and lease backs

Air carriers vs. airports

Air carriers	Airports
Revenue traffic	**Commercial traffic**
Revenue **passengers carried**	**All passengers *embarked and disembarked***
Revenue **aircraft departures**	**Aircraft *movements (landings plus take-offs)***

Risks and Proposed Mitigation Steps

Risks associated with Data collection and analysis

- Data collection and analysis to be tailored to meet the requirement of each entity.
- Constraints of resources – Time, Financial and Personnel – Poor Reporting Culture
- Interpreting Data due to different definitions

Proposed Mitigation Steps

- Financial assistance from other UN stakeholders to develop Databases and analysis function.
- Knowledge transfer from ICAO to appropriate Personnel.
- Use of ICAO Reporting instructions and standard definitions
- Costs benefits of using electronic data sources, computerization and outsourcing.
- ICAO AFRAA Proposed Joint Initiative

Management Reporting

MIS and Management Reporting

- Quick Monitoring System (Uplift messages)
- Monthly Reporting (Accounting data)
- Cash flow statements
- Aircraft utilization
- Fuel consumption
- On time performance
- Statutory Reporting

Revenue Hours/ Acft Days Available

Delays by A/c & category

Variance analysis – A Management tool

- Variance analysis - Helps in understanding the sources of variance between compared data.
- Variance Analysis assists Top Management in Strategizing and decision making.
- Variance analysis – Can be done on financial, Operational or safety data

Variance Analysis – An Example

ETHIOPIAN AIRLINES - VARIANCE ANALYSIS OF FINANCIAL RESULTS				
Description	2006	2005	Var (%)	Var
Op Rev (U$ Mill)	620	492	26.0	128
OP exp (U$ Mill)	593	449	32.1	144
OP P/(L)	27	43	-37.2	-16
RTK (Mill)	973	746	30.4	227
ATK (Mill)	1890	1419	33.2	471
Yeild US cents)	63.7205	65.9517	-3.4	-2.231
Cost/ATK (US Cents)	31.3757	31.642	-0.8	-0.266
OLF (%)	51.4815	52.5722	-2.1	-1.091
BEP (%)	49.2395	47.9775	2.6	1.262
1ETB=1USD	0.11478	0.11367	1.0	
Analysis of difference in Op.Revenues	US$ Mill	US$ Mill		
Yield				
Due to exchange (translation)	4			
Due to yield	-26	**-22**		
Increase in **Traffic**		**150**		
Total		**128**		
Analaysis of difference in Op.costs	US$ Mill	US$ Mill		
Unit costs				
Due to exchange (translation)	3			
Unit costs	-8	**-5**		
Increase in **Capacity**		**149**		
Total		**144**		

Other High Level Indicators

- Traffic and Capacity growth
- Market Share Vs Freq
- Yields , Unit costs
- Load factors and Break
- Aircraft Utilization
- Accident and Incident Rates

Is the utilization of capacity efficient ?

Is the market share frequency share in line with competition?

Has my Strategy of dropping yield more than matched by increase in traffic, How is my cost control strategy v

In which routes is the load factor – Break even gap so large that a different route strategy is warranted ?

What can be done to improve utilization- Wha ben

Is the trend declining, which technical categories are an issue and why?

Financia

- Solvency Ratio – Predictor of Bankruptc
- Asset Turnover – Efficiency of Assets in generating Revenues.
- Receivables Turnover – For cash flow
  bad debts.
- Financial leverage – Reliance
- Profit Margins – Better to invest in Car
- Sustainable Growth Rate- The growth rate possible without equity or debt fina

Quick Cash Assets/Total current Liabilities

Total Operating Revenues/Total Assets

Total Operating Revenues/Receivables (Debtors)

Total Debt/Shareholder's Equity

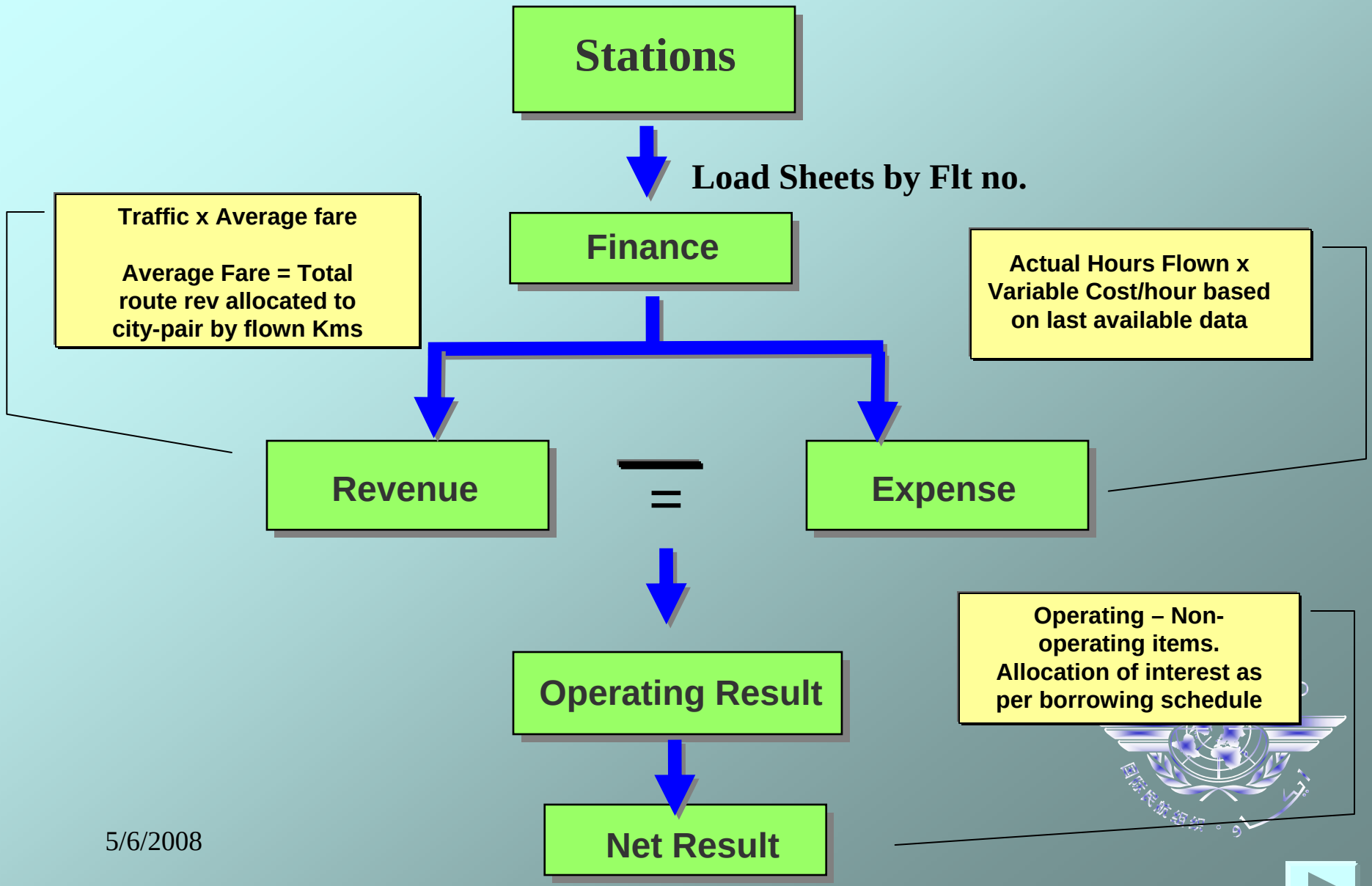
Income/Operating Revenues

Retained Earnings/

Shareholders Equity

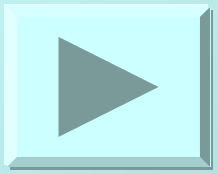
MIS and Management Reporting

MIS and Management Reporting

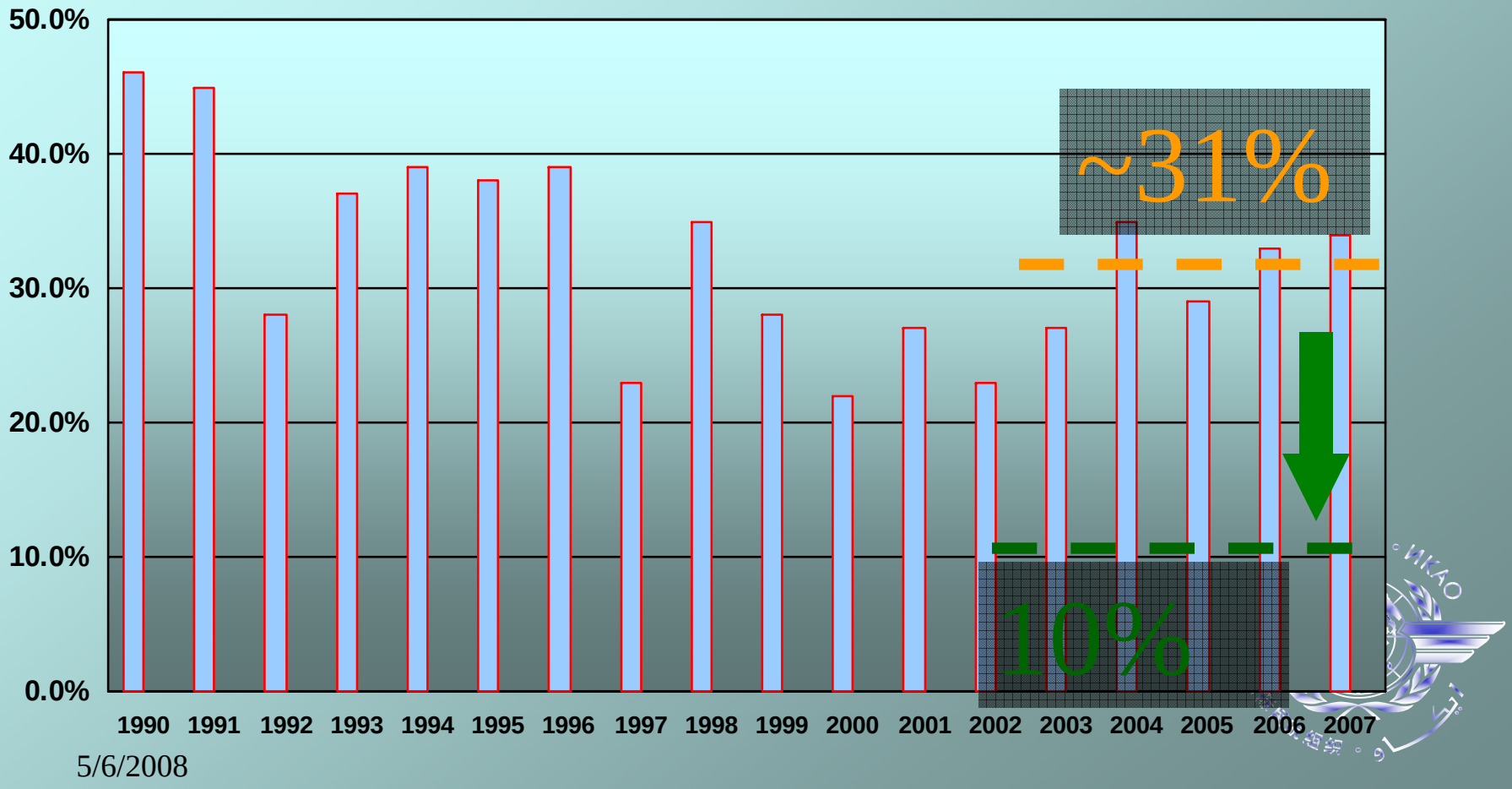


Safety Analysis

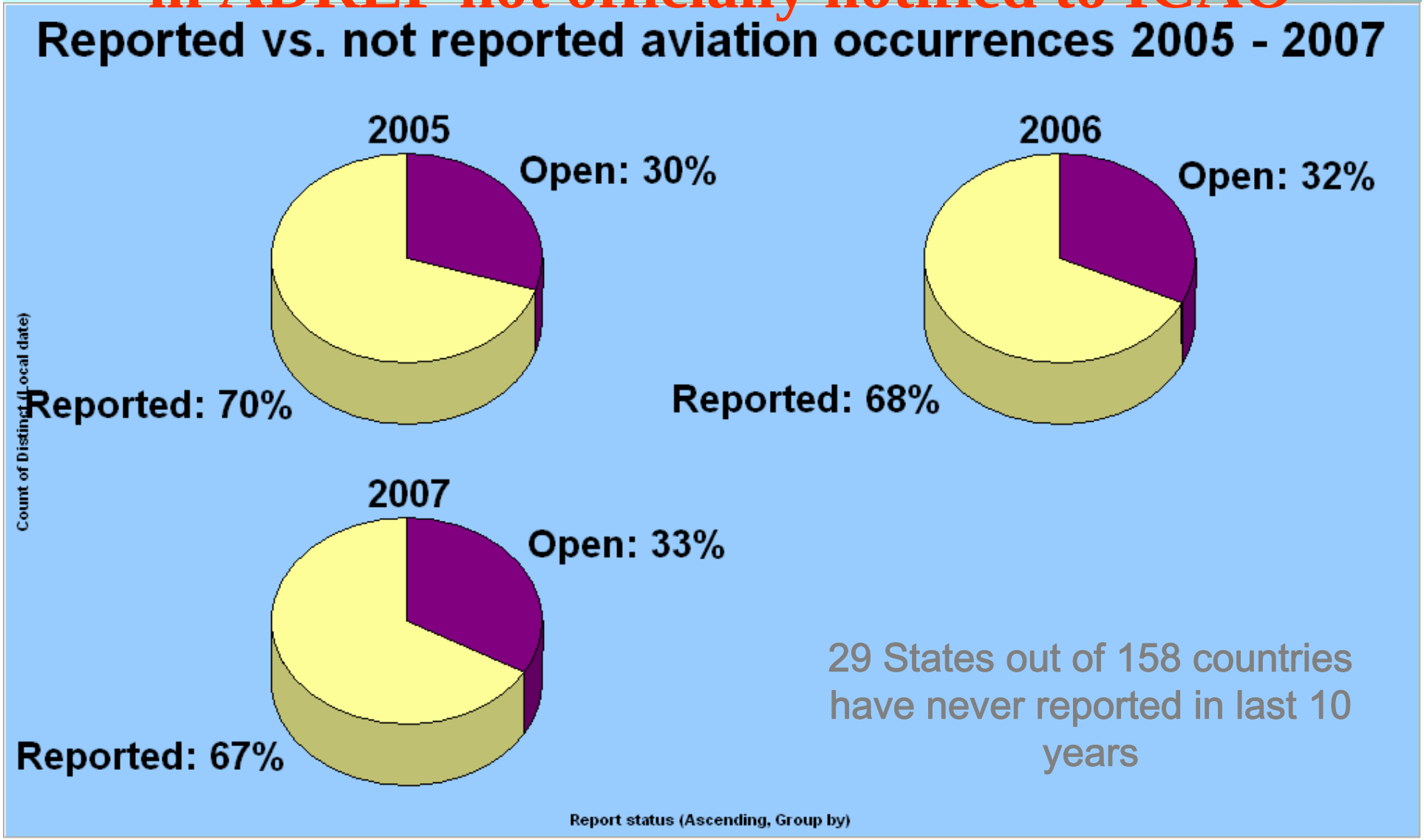
Analysis

- ECCAIRS 
- To monitor the level of safety
- To compare relationships of different traffic parameters
- Technical categories contributing to Accidents and Incidents
- For investigating and remedial action

Global Reporting Culture
Percentage of Open Files

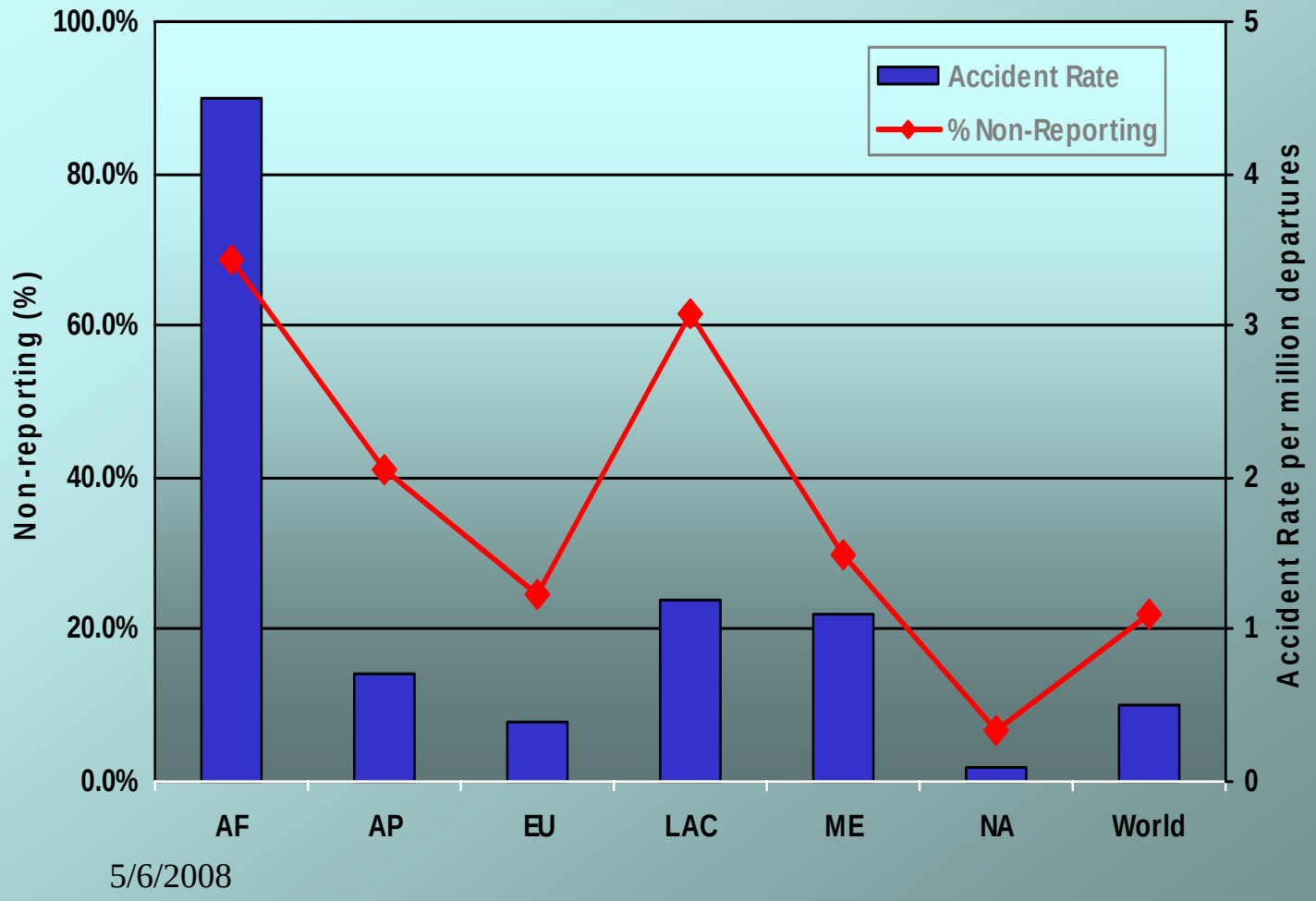


High Level Indicator 2 : Percentage of accidents/serious incidents in ADREP not officially notified to ICAO



29 States out of 158 countries have never reported in last 10 years

ADREP Reporting Culture and Accident Rate by Region (1998-2007)

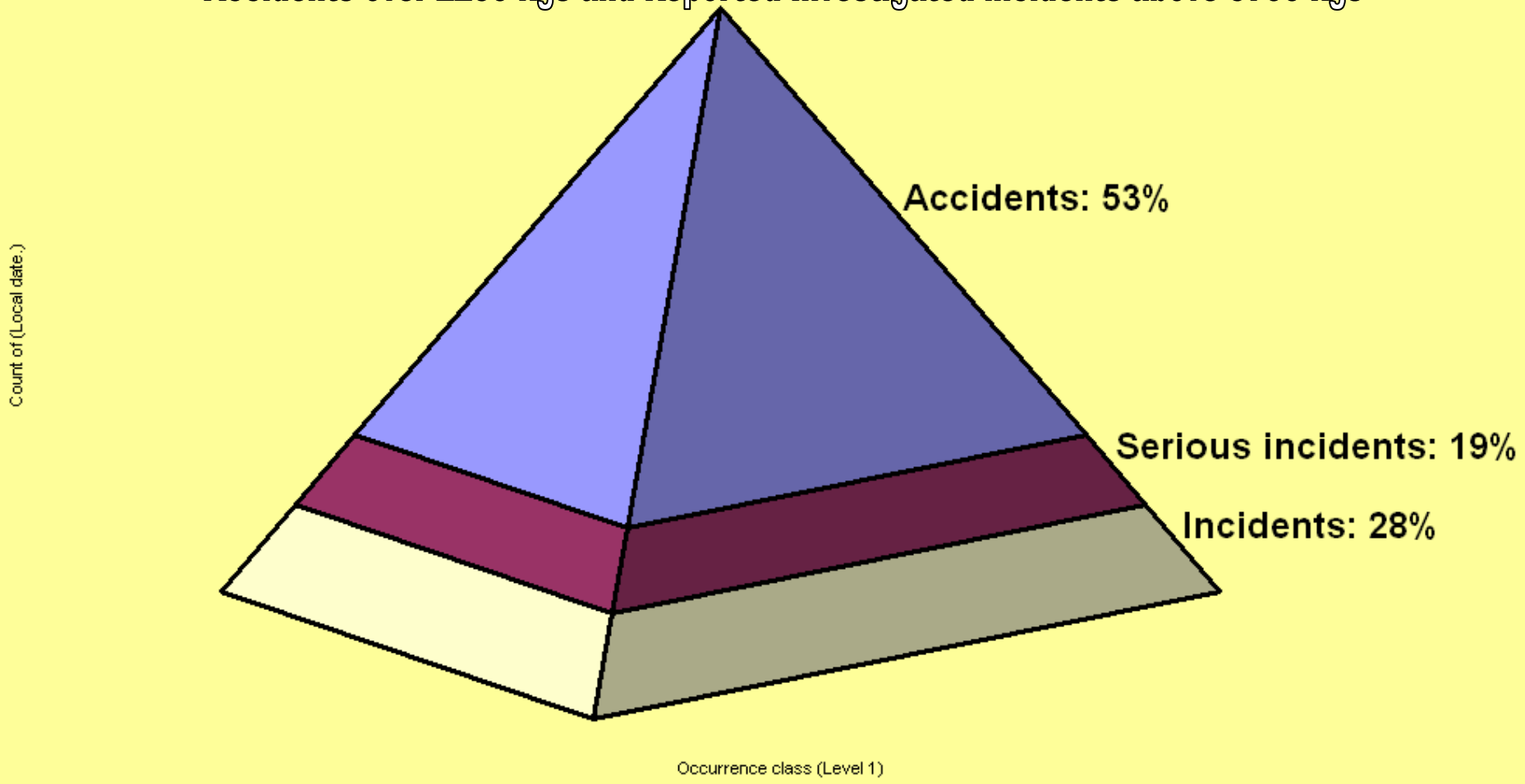


REG	Reported	Total
AFR	138	443
AP	371	629
EUR	1132	1502
LAC	193	503
ME	47	67
NA	3488	3738
WORLD	5369	6882

5/6/2008

Occurrence Classifications 5 yrs

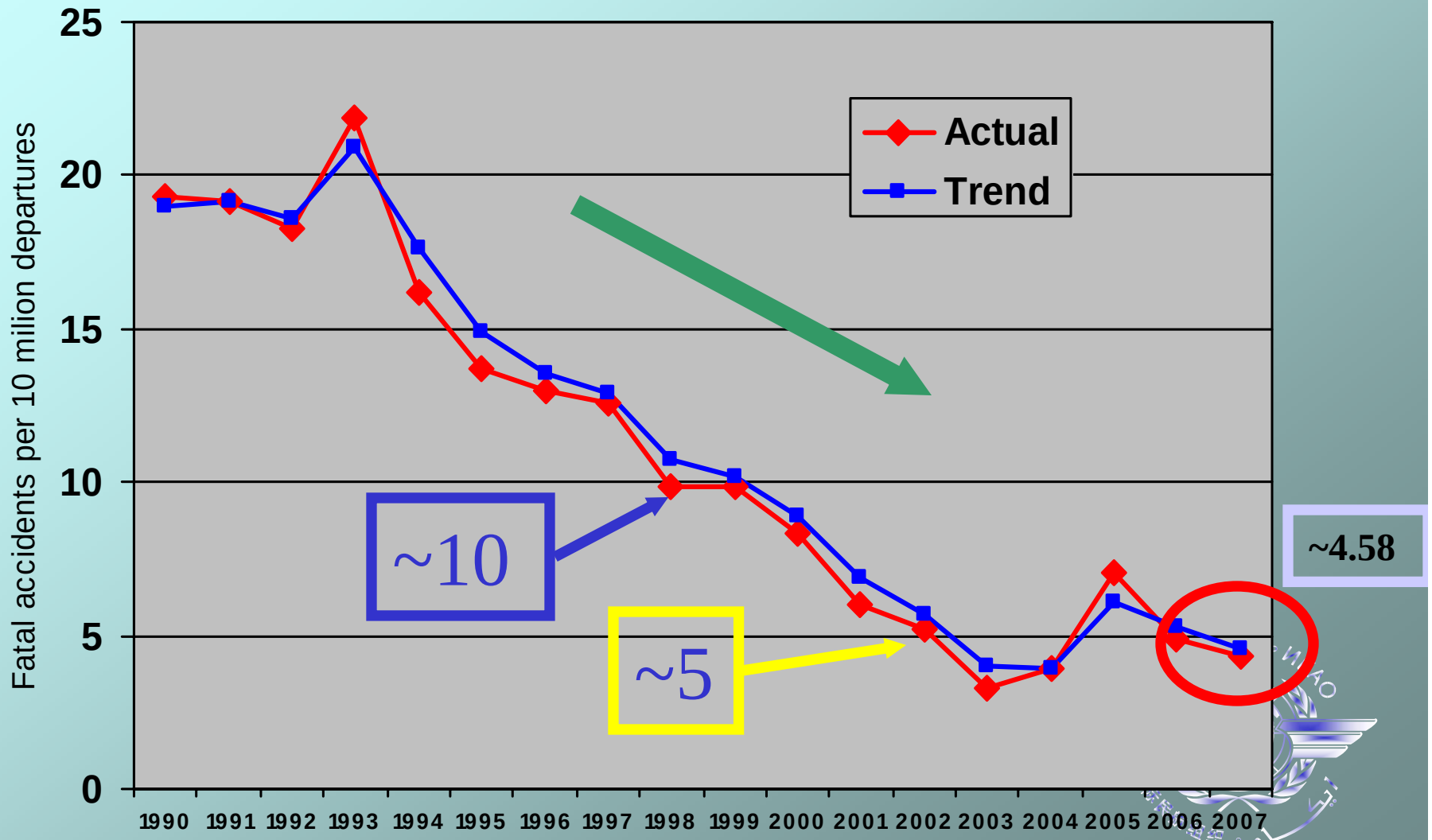
Accidents over 2250 kgs and Reported Investigated incidents above 5700 kgs



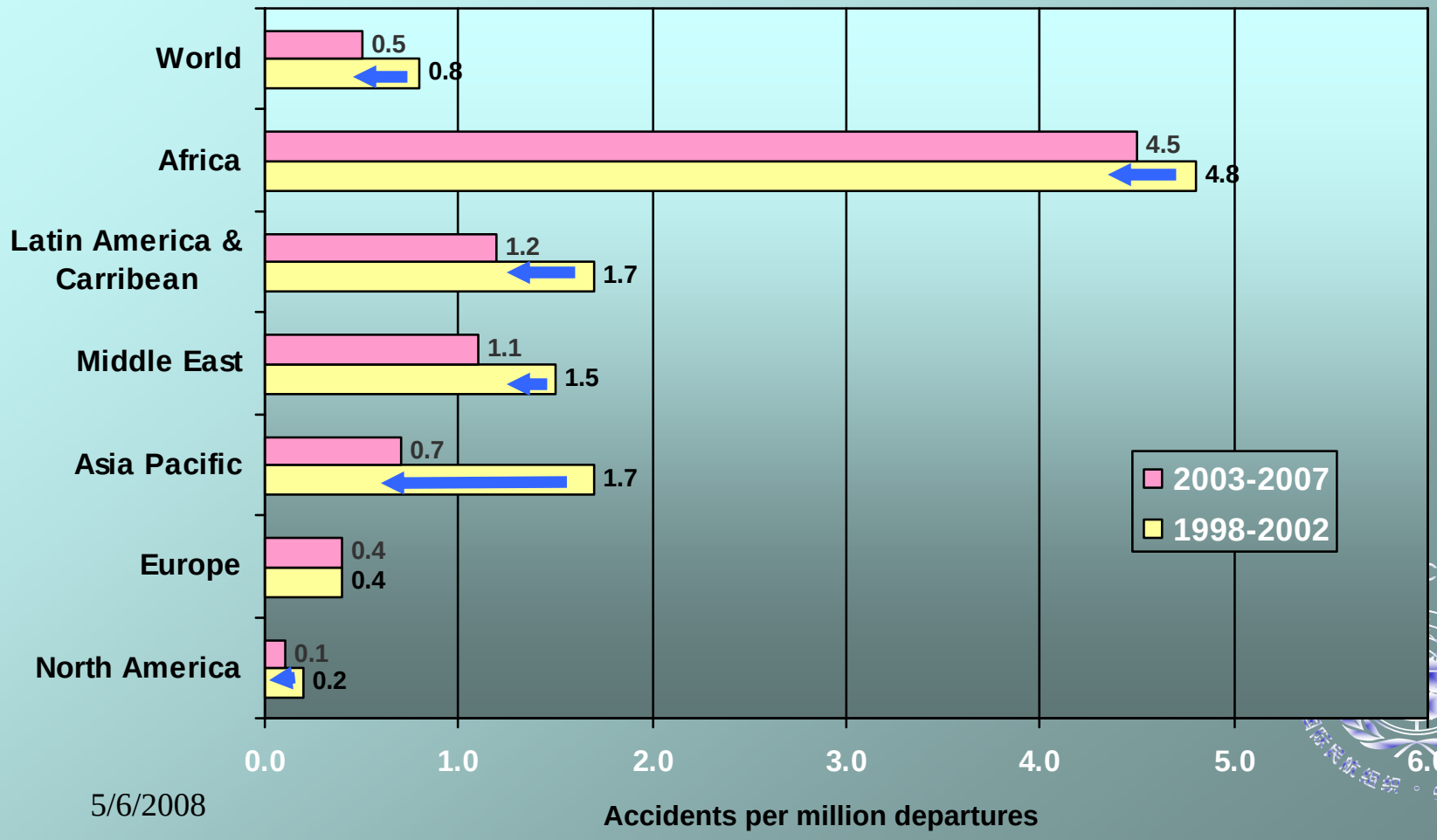
High Level Indicator 1 : Fatal Accident Rate

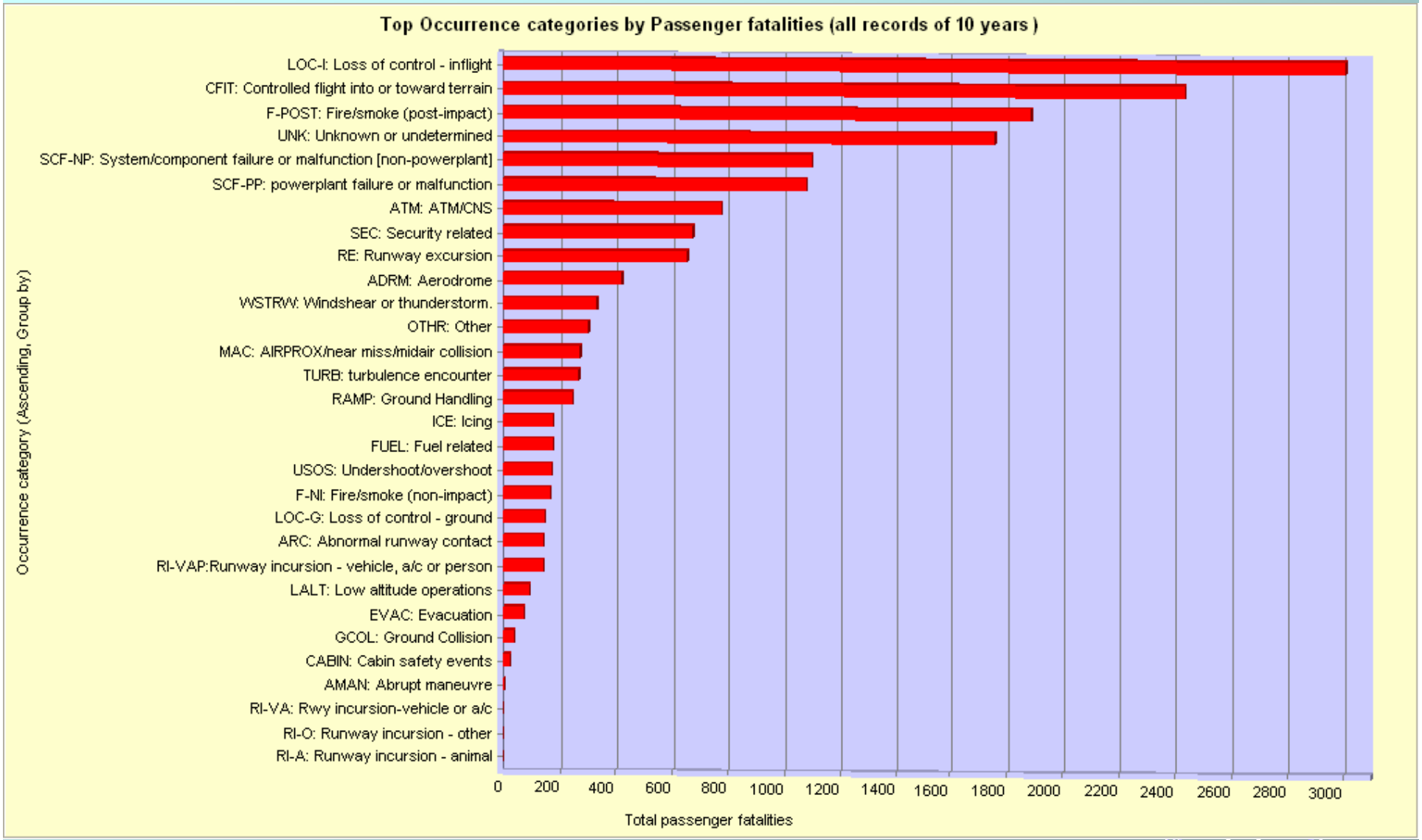
- Occurrence with PAX fatality
- MTOM > 2 250kg
- Occurrences that are not solely categorized as security related
- Scheduled operations

Passenger accident fatal rate trend line
(Passenger Scheduled Services for aircraft with MTOW > 2250kgs)

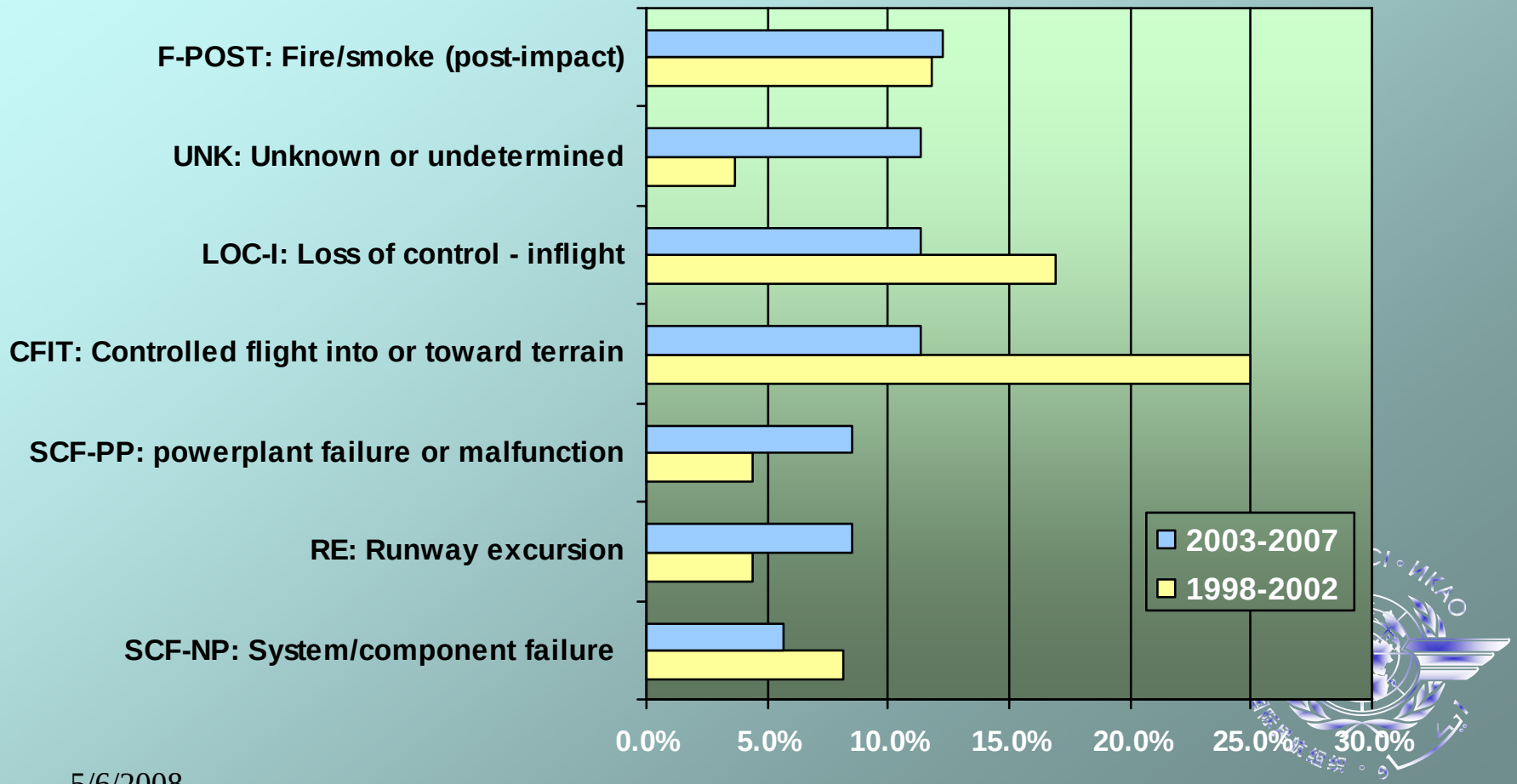


Accident Rate
Fatal Accidents - Scheduled Operations by Region

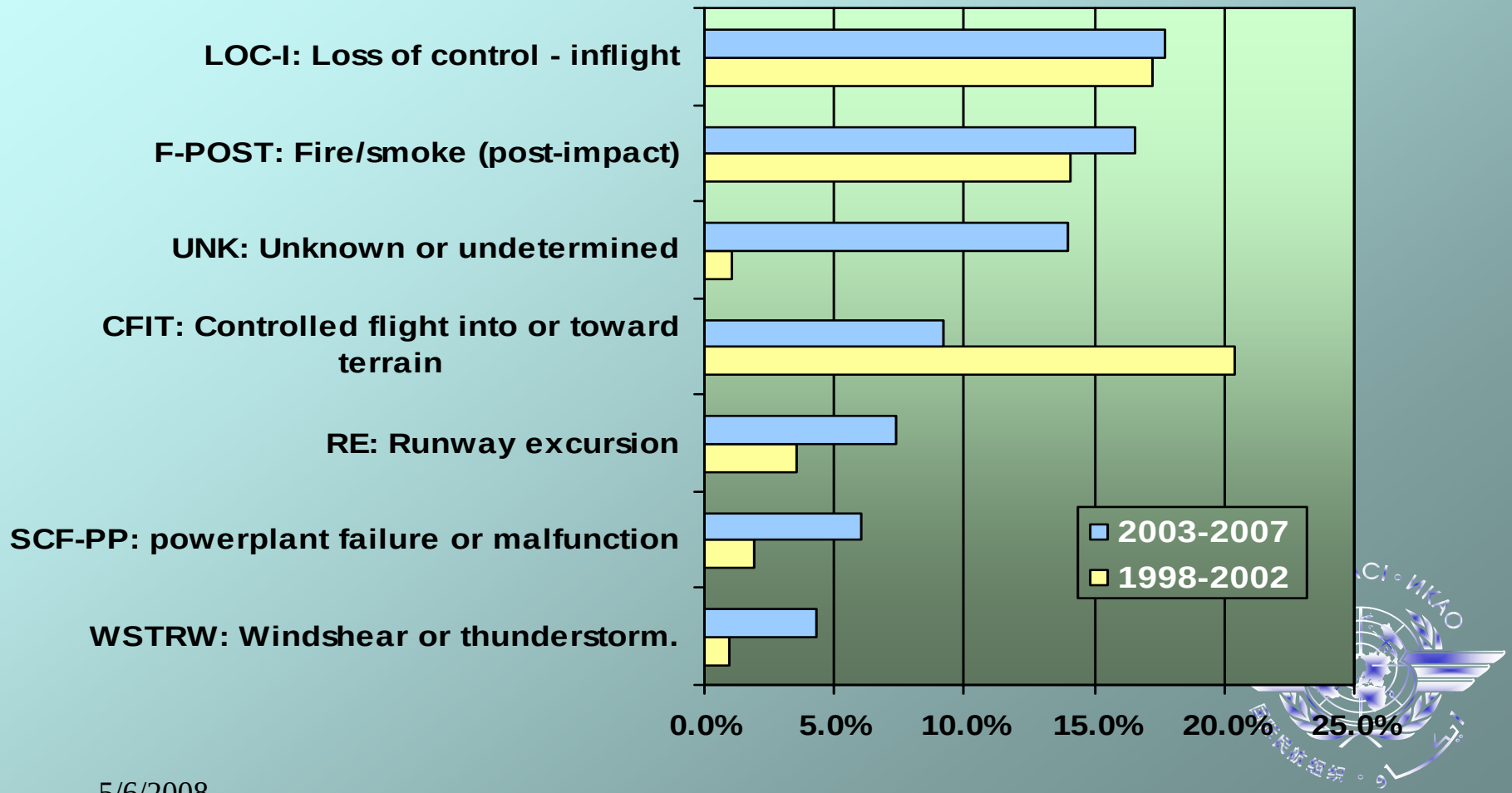



Top Occurrence categories by Passenger fatalities (all records of 10 years)
Occurrence category (Ascending, Group by)
LOC-I: Loss of control - inflight
CFIT: Controlled flight into or toward terrain
F-POST: Fire/smoke (post-impact)
UNK: Unknown or undetermined
SCF-NP: System/component failure or malfunction [non-powerplant]
SCF-PP: powerplant failure or malfunction
ATM: ATM/CNS
SEC: Security related
RE: Runway excursion
ADRM: Aerodrome
WSTRW: Windshear or thunderstorm.
OTHR: Other
MAC: AIRPROX/near miss/midair collision
TURB: turbulence encounter
RAMP: Ground Handling
ICE: Icing
FUEL: Fuel related
USOS: Undershoot/overshoot
F-NI: Fire/smoke (non-impact)
LOC-G: Loss of control - ground
ARC: Abnormal runway contact
RI-VAP:Runway incursion - vehicle, a/c or person
LALT: Low altitude operations
EVAC: Evacuation
GCOL: Ground Collision
CABIN: Cabin safety events
AMAN: Abrupt maneuvre
RI-VA: Rwy incursion-vehicle or a/c
RI-O: Runway incursion - other
RI-A: Runway incursion - animal
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
Total passenger fatalities

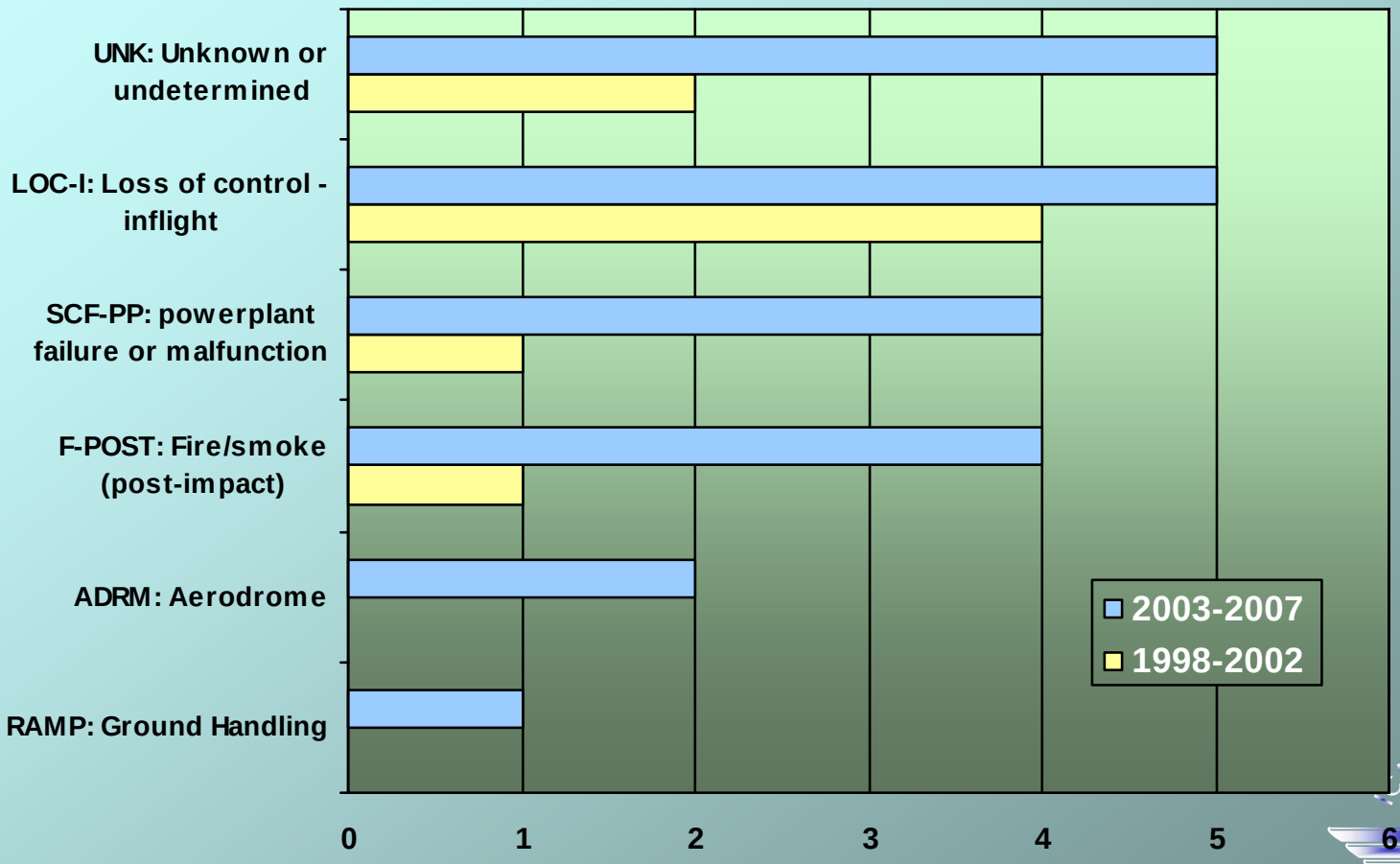
Fatal Accidents Comparative Percentage



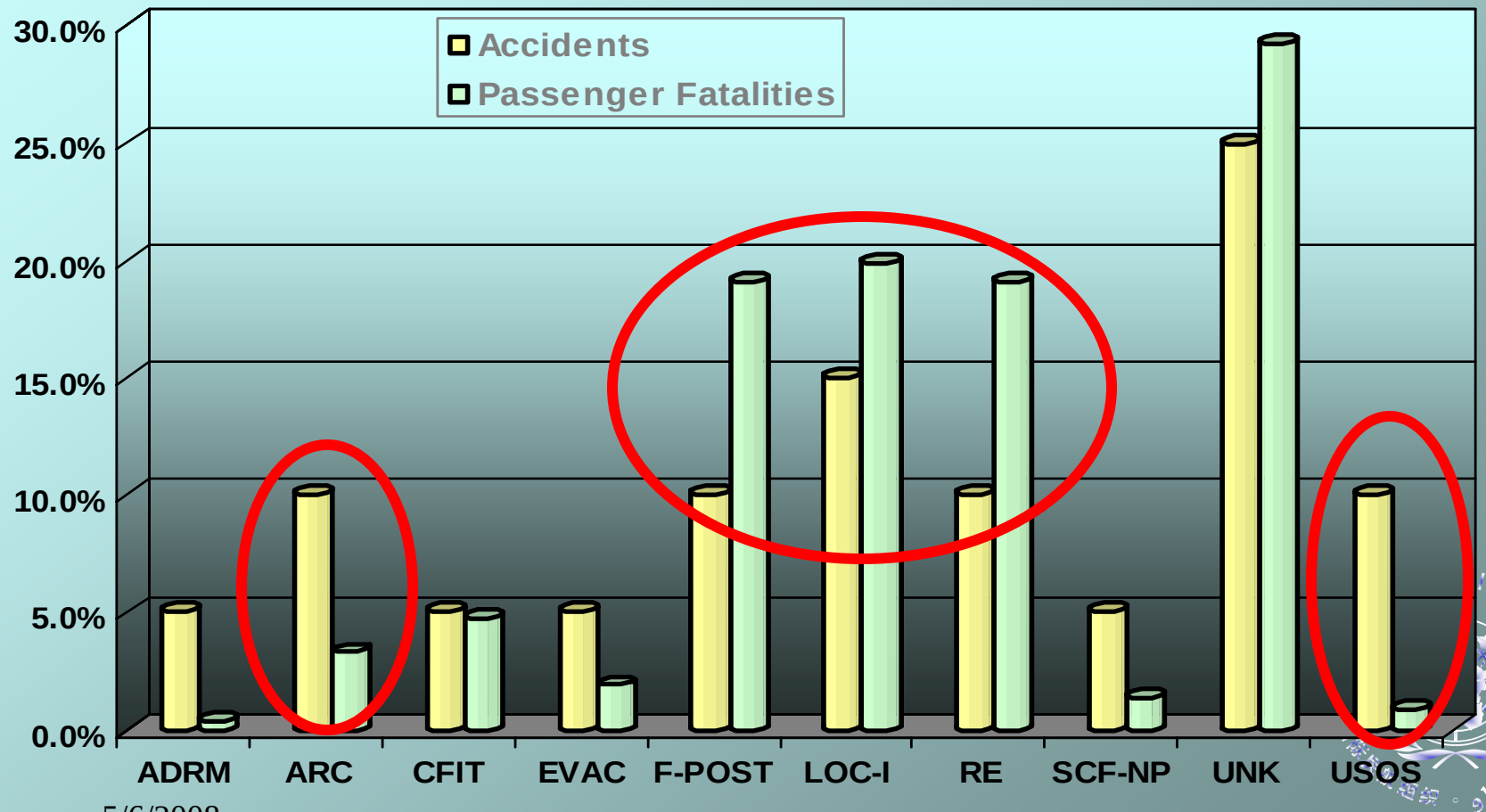
Fatalities Comparative Percentage



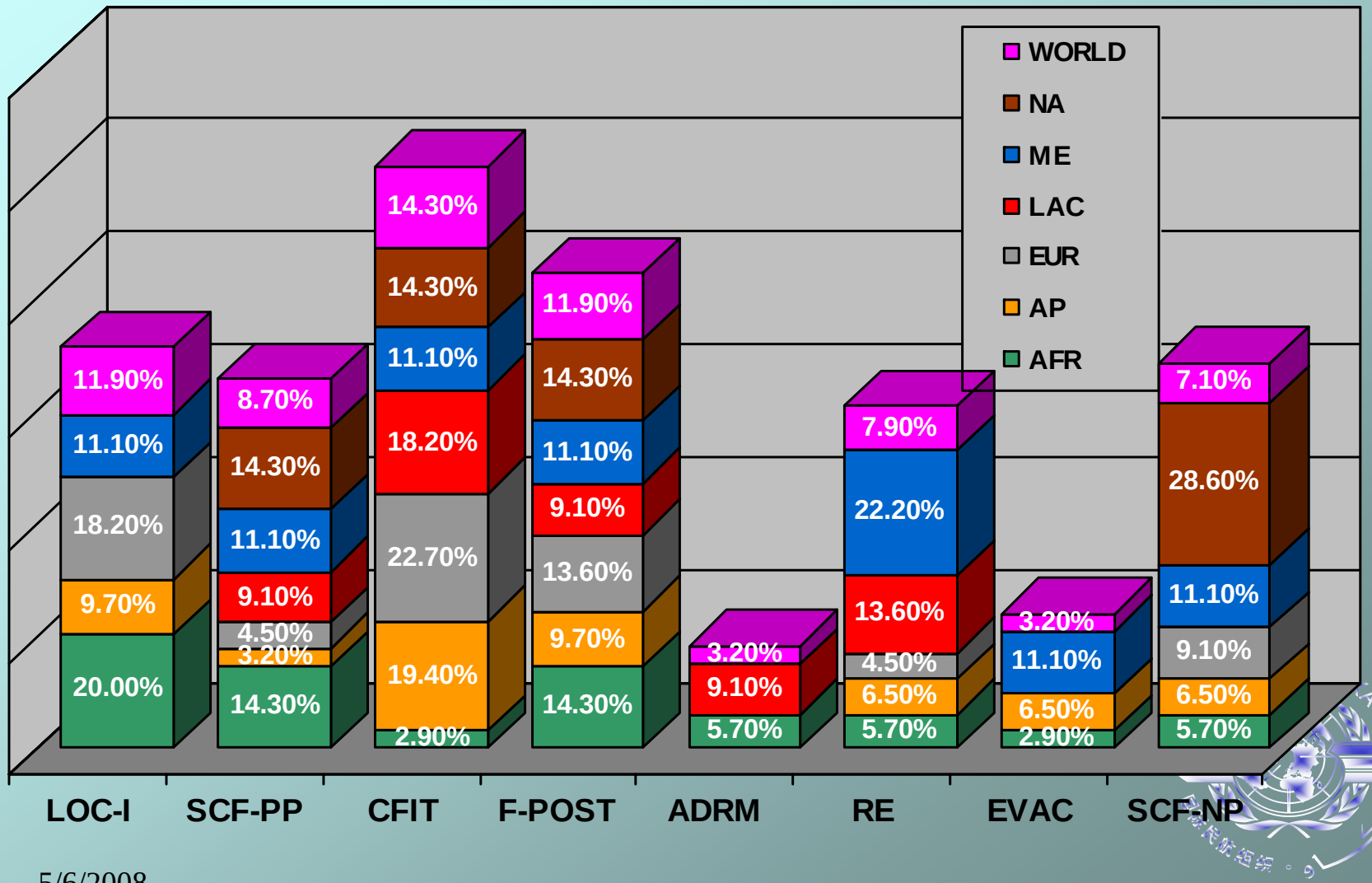
Top Killers by Region - AFI



Recent Distribution (Year 2007) by Accident Category



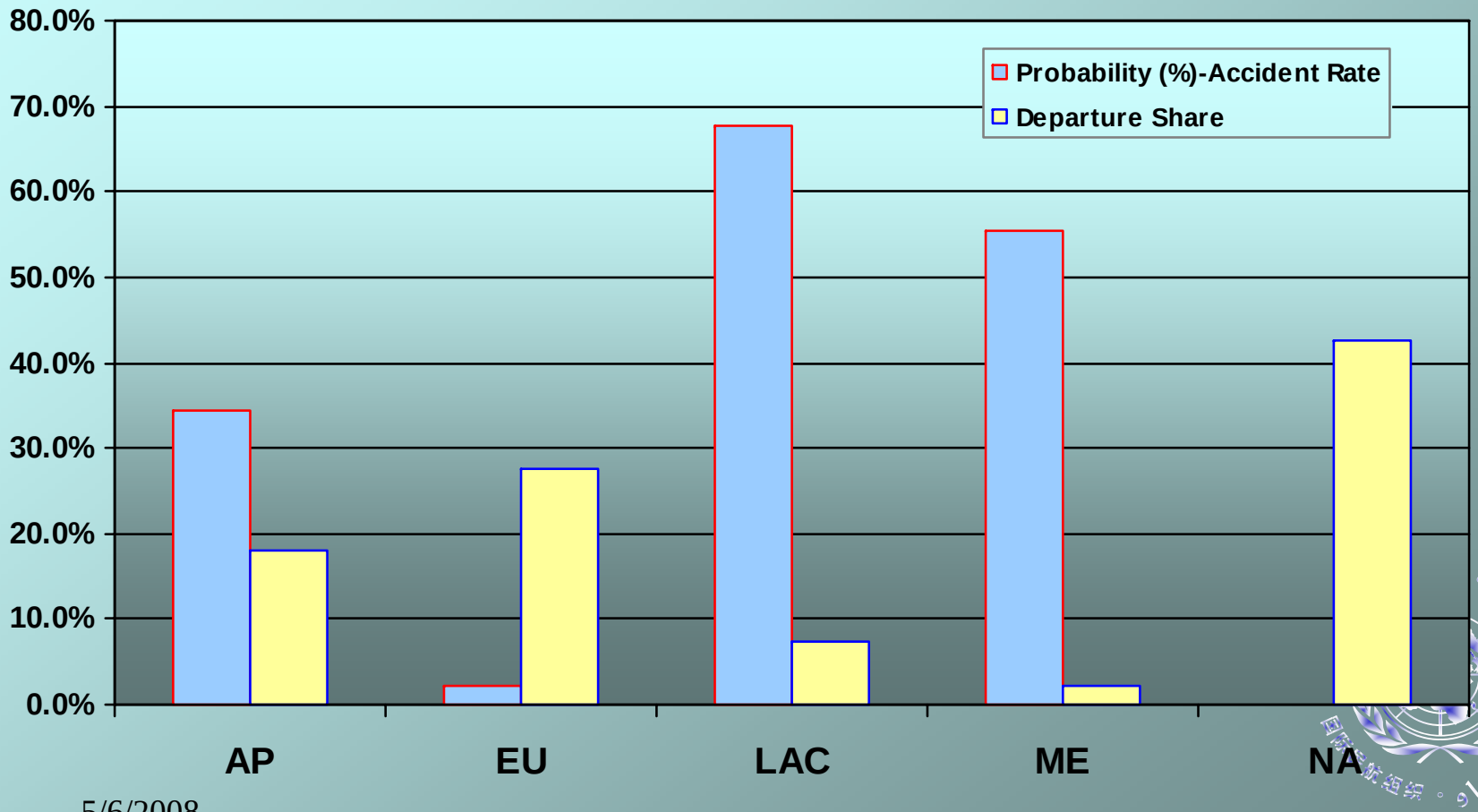
Regional Distribution of major Occurrence Categories (2002-2007)



Probability distribution

- Will tell us what are the Odds in beating the average accident rate.
- Improving safety performance should see the holistic probability staying below 50%.
- Will enable us to focus on key areas where the probability of accident rates exceeding the average rate is more than 50%.

Probability (%) of Accident rate exceeding twice the mean accident rate (2000 - 2007)



Micro analysis

- Extend the trend and probability analysis into a more micro level to identify areas where more focus may be required.
- This could be area of occurrence, occurrence category, number of landings or other parameters that the analysis throws out.
- Relating databases to expand the analytical capabilities more specifically ECCAIRS with Oversight database.
- % of audit non compliance and relationship with accident rates
- Standardize the accident rate methodology.

Relationship between Accident rates and Critical elements of the USOAP Program

Critical Element	Relationship
CE8	0.96 (Very Strong)
CE6	0.95 (Very Strong)
CE3	0.95 (Very Strong)
CE7	0.93 (Very Strong)
CE2	0.76 (medium)
CE5	0.73 (medium)
CE4	0.72 (medium)
CE1	0.52 (weak)

Conclusions

- Know your data sources
- Understand the meaning of the data
- Make objective decisions based on data and due analysis
- Be Proactive in collecting and interpreting new data streams as required
- Make sure that the benefits of collecting and interpreting data far exceeds the costs
- If in doubt ASK

THANK YOU

Remember…

Without Data all you are is just another person with an opinion!