



2005 Asia-Pacific Conference on Risk Management and Safety 1 – 2 December 2005

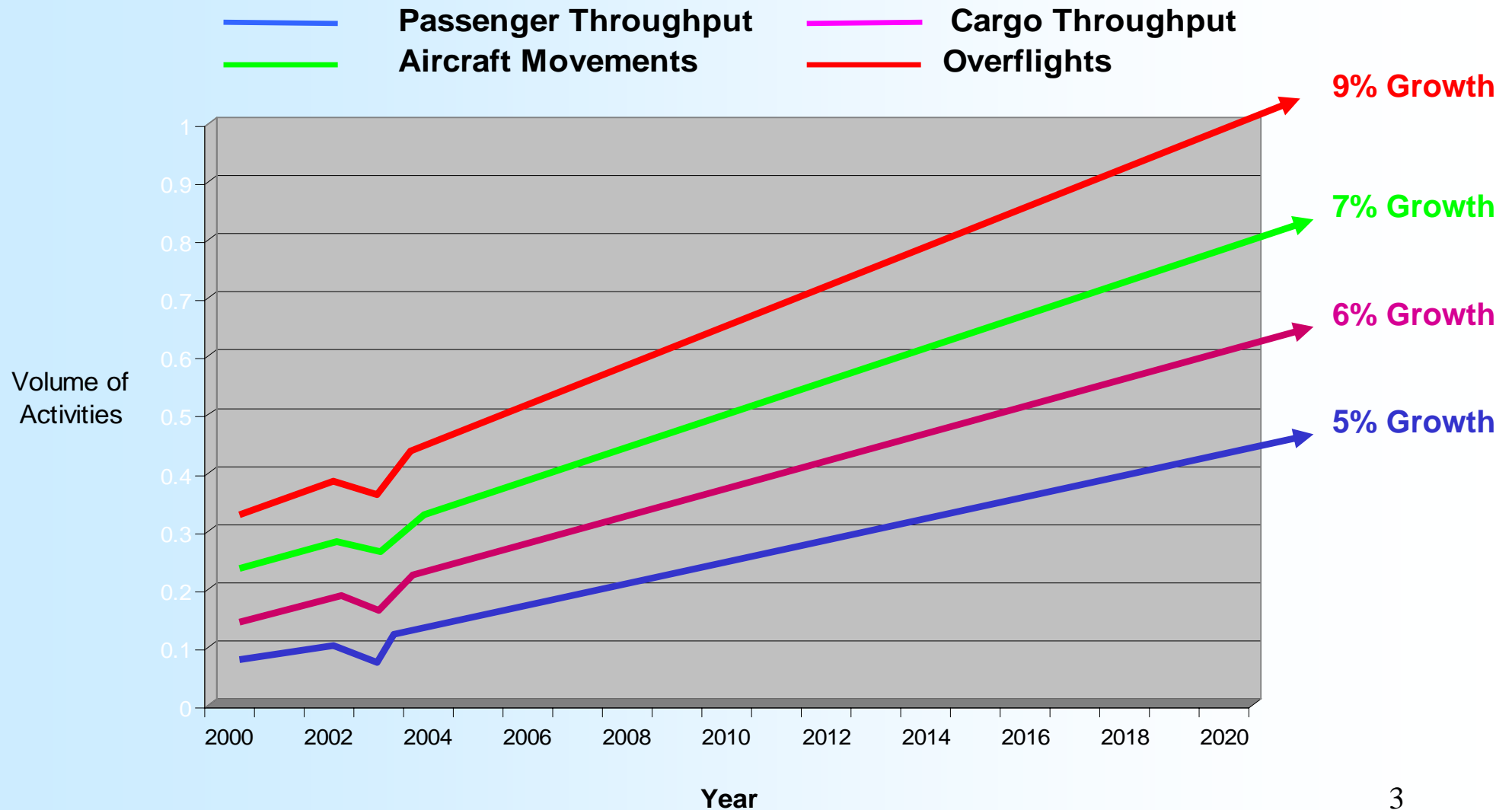
Norman Lo
Civil Aviation Department
Hong Kong



Applying the Concept of Safety Management to the Civil Aviation System in Hong Kong



Volume of Aviation Activities in Hong Kong





Remarkable Growth

- **Economic buoyancy**
 - Booming of regional and global economy
 - Progressive liberalization of air services policy
- **Ever-improving connectivity of the HKIA**
 - 140+ destinations
 - 70+ international airlines
- **More locally based airlines**
 - CR Airways
 - Hong Kong Express
 - Oasis Airlines



State-of-the-Art Technology

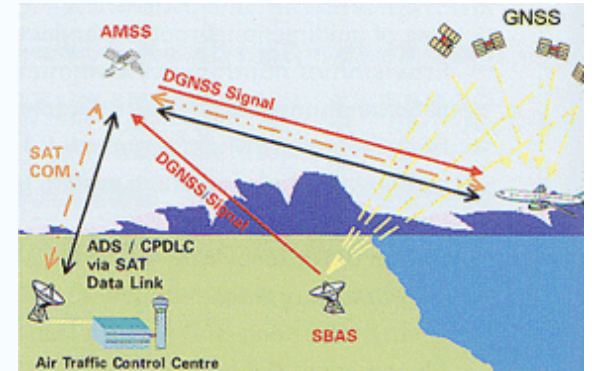


© AIRBUS S.A.S. 2005 _ photo by efm company / H. GOUSSE

- Airlines and Aircraft
 - New large aircraft Airbus A380
 - Boeing 787 Dreamliner



- Air Traffic Management
 - Enhancement of ATC services through CNS/ATM



- Airports
 - Infrastructures upgrade for A380
 - Radio Frequency Identification Device (RFID) for baggage handling





Safety is always
accorded
the highest priority.

Civil Aviation Department

*Committed to a Safe and
Efficient Air Transport System*



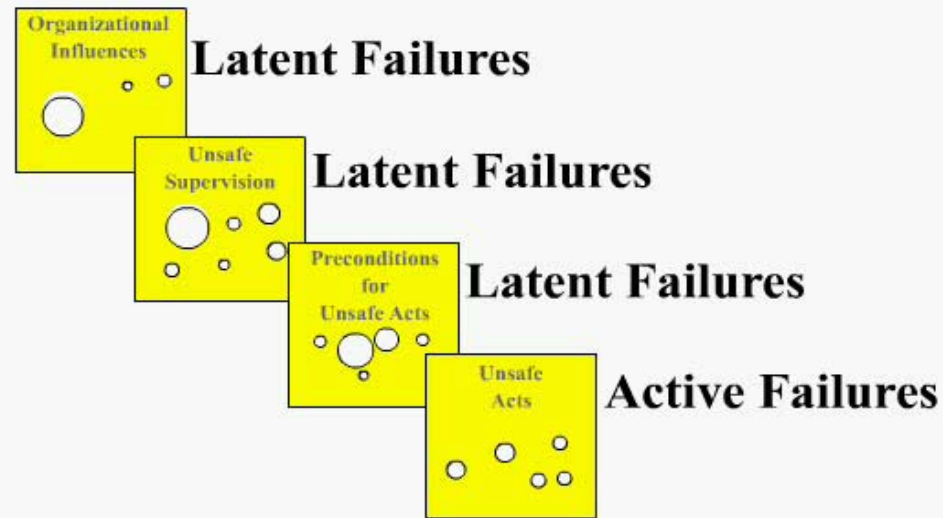
International Civil Aviation Organization

- Ensure the safe and orderly growth of international civil aviation
- Encourage the growth and safe development of
 - Airlines
 - Aircraft Design and Maintenance
 - Air Traffic Management
 - Airports



SAFETY MANAGEMENT

- Systematic management of the risks associated with the operation of the aviation system for the purpose of achieving high level of safety performance



The Cheese Model of Accident Causation

Source: Reason, J. (1997), *Managing the Risks of Organizational Accidents*, U. S. A.: Ashgate Publishing Limited.



Major Roles of CAD

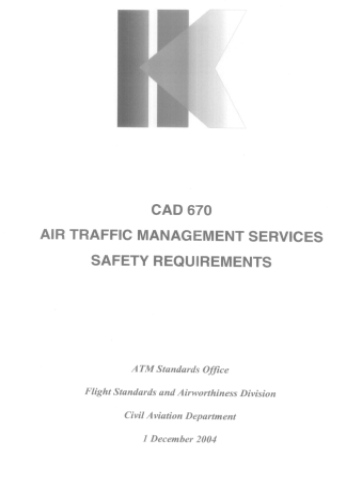
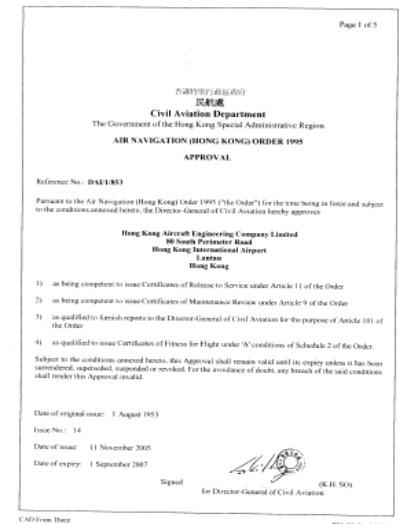
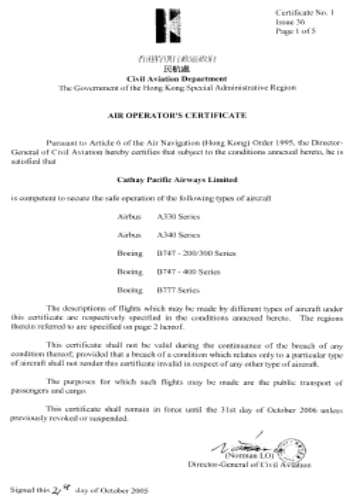
- Regulator to exercise safety oversight on civil aviation activities
- Service provider for air traffic management services (Mr David Cheung)
- Air accident investigation





民航處 Civil Aviation Department

Major Components of the Aviation System





Application of Safety Management

- ICAO requirement on SMS in its Annexes – effective from November 2006
- Safety Oversight Audit Programme
- CAD as a regulator to ensure the implementation of SMS by aviation service providers



Safety Management on Airline Flight Operations

- Local airlines in Hong Kong
 - Operate commercial air transport services under an AOC
- Compliance with AOC Requirements Document – Accident Prevention and Flight Safety Programme
- Airlines to have systematic procedures for receiving and processing reports from crew members with flight safety implication





Threat and Error Management Model

- Three basic components
 - Threats
 - Errors
 - Undesired aircraft states
- Threats and errors
 - must be managed by flight crews
 - carry the potential to generate undesired aircraft states
- Broadest application – flight crew human performance training

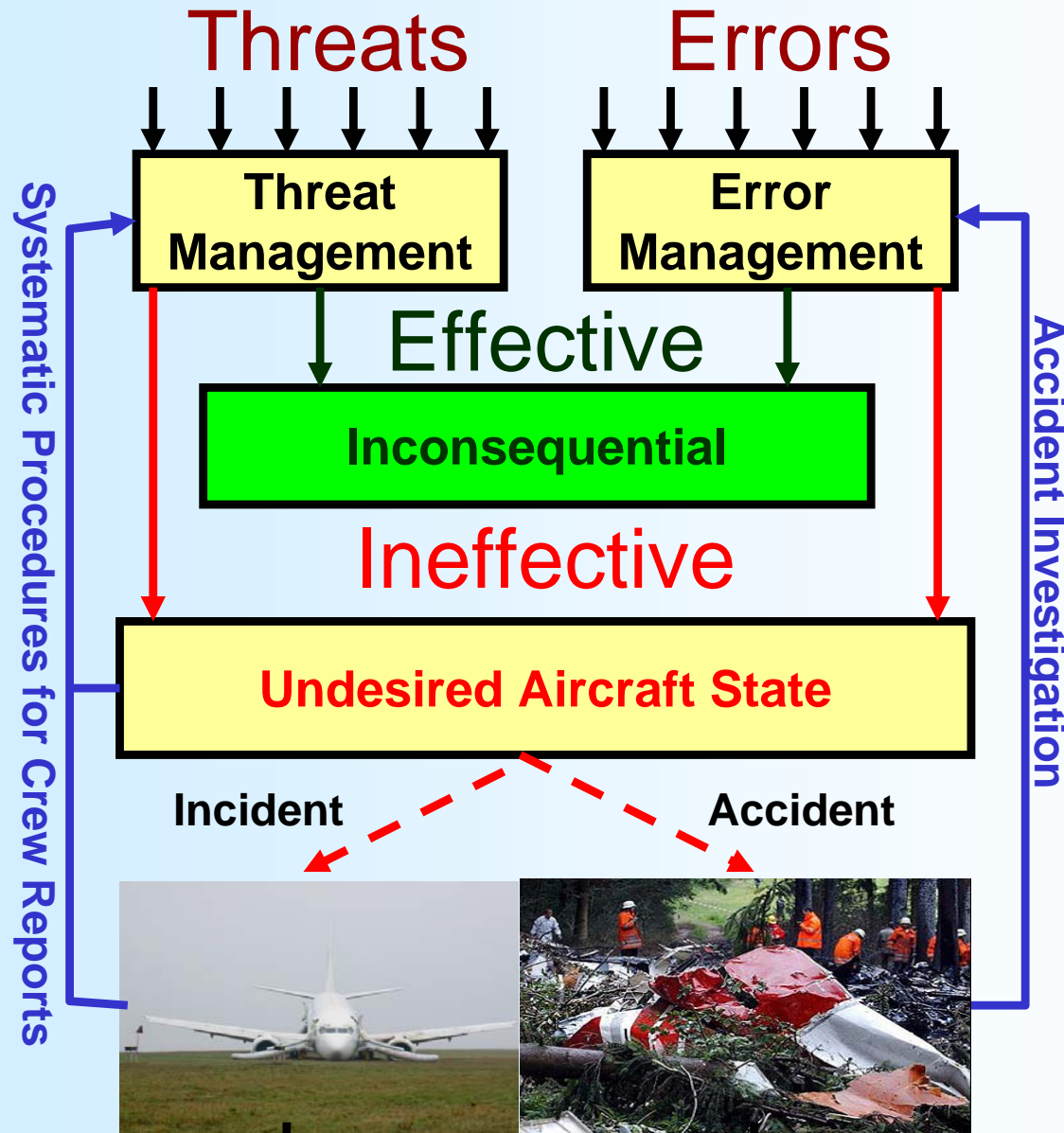


TEM Model – Three Basic Components

- **Threats** – Events that occur beyond the influence of the flight crews
- **Errors** – Actions or inactions by the flight crews that lead to deviations from organizational or flight crews' intentions or expectations
- **Undesired aircraft states** – resulted from ineffective threat and/or error management



TEM Model



03.00	CONTENTS
03.01	GENERAL INFORMATION
03.02	FLIGHT PREPARATION
03.03	SAFETY EXTERIOR INSPECTION
03.04	PRELIMINARY COCKPIT PREPARATION
03.05	EXTERIOR INSPECTION
03.06	COCKPIT PREPARATION
03.07	BEFORE PUSHBACK OR START
03.08	ENGINE START
03.09	AFTER START
03.10	TAXI
03.11	BEFORE TAKEOFF
03.12	TAKEOFF
03.13	AFTER TAKEOFF
03.14	CLIMB
03.15	CRUISE
03.16	DESCENT PREPARATION
03.17	DESCENT
03.18	ILS APPROACH
03.19	NON PRECISION APPROACH
03.20	VISUAL APPROACH
03.21	PRECISION APPROACH
03.22	LANDING
03.23	GO AROUND
03.24	AFTER LANDING
03.25	PARKING
03.26	SECURING THE AIRCRAFT
03.90	STANDARD CALLS

BEFORE START	APPROACH
COCKPIT PREP COMPLETE (COMPLETE)	BRIEFING CHECKED
GEAR PINS and COVERS REMOVED	ECAM STATUS CHECKED
SIGNS ON, AUTO	V. BUGS SET (SET)
ADIRS NAV	SEAT BELTS ON
FUEL QUANTITY KGS	ENG MODE SEL NORMAL (N)
TO DATA, V. BUGS SET (SET)	BARO, MDA/DA SET (SET)
BARO REF SET (SET, FT)	
WINDOWS, DOORS CLOSED (CLOSED)	
BEACON ON	
THR LEVERS IDLE	
PARKING BRAKE SET	
AFTER START	LANDING
ANTI ICE OFF/ON	CABIN CREW ADVISED
ECAM STATUS CHECKED	AUTOTHURST SPEED/IDLE
PITCH TRIM UP/DOWN SET	ECAM MEMO LGD, NO BLUE
RUDDER TRIM ZERO	
BEFORE TAKEOFF	AFTER LANDING
FLIGHT CONTROLS CHECKED (CHECKED)	FLAPS RETRACTED
FLIGHT INSTRUMENTS CHECKED	SPOILERS DISARMED
	RADAR, TCAS OFF/STBY
BRIEFING CONFIRMED	
FLAP SETTING FLAP SET (SET)	
V. IN V. FLEX TEMP FLEX SET (SET)	
TRANSPONDER AUTO SET	
ECAM MEMO TO NO BLUE	
ENGINE OIL WITH OIL MARK	
ENGINE READY TO CONDUCT TEST	
CAPTURE ON	
CABIN CREW ADVISED	
ENG MODE SEL NORMAL (N) / IGNITION	
PACKS ON/OFF	
AFTER TAKEOFF / CLIMB	SECURING THE AIRCRAFT
LDG GEAR UP	OXYGEN OFF
FLAPS RETRACTED	APU BLEED OFF
PACKS ON	EMER EXIT LT OFF
BARO REF SET (SET)	NO SMOKING OFF
	APU AND BAT OFF
	PARKING BRAKE SET
	Consider COLD WEATHER



CAD's Role on Safety Management on Airline Flight Operations

- Regulatory inspections on AOC holders
 - Flight inspections on flight deck (130)
 - Operations inspections at outstations (20)
 - Operational records inspections (3)
- Regular meetings with AOC holders
- Overall assessment before AOC renewal





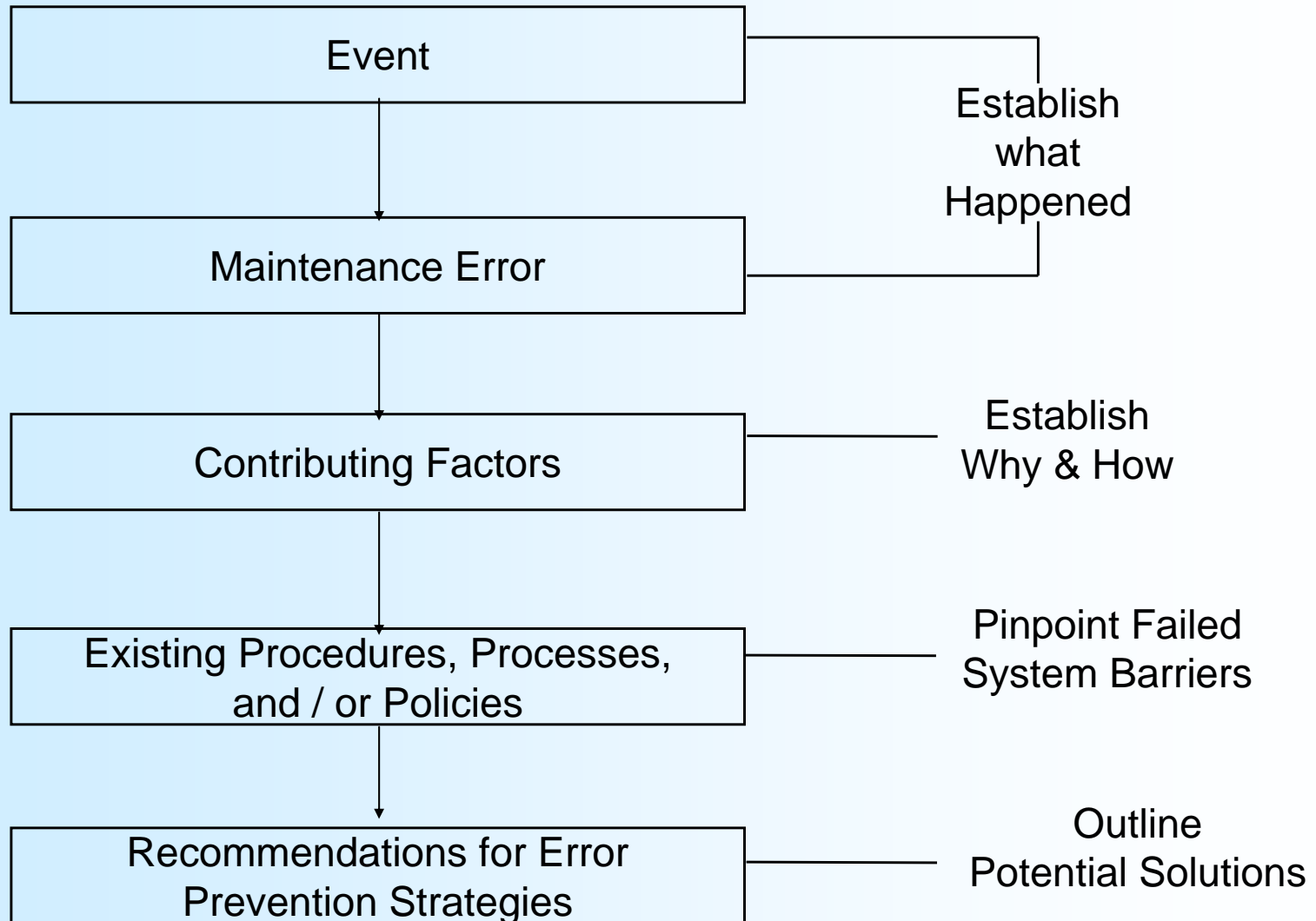
Safety Management on Aircraft Engineering

- Maintenance organizations to maintain the Hong Kong registered aircraft to the required engineering standard under an approval issued by CAD
- Maintenance organizations to establish a safety and quality policy and include the policy in their exposition





MEMS Flowchart





CAD's Role on Safety Management on Aircraft Engineering

- Regulatory monitoring on maintenance organizations
 - Inspections on local and overseas maintenance organizations (63)
 - Inspections on maintenance services at outstations (18)
 - Inspections on maintenance training organizations (9)
- Regular meetings with maintenance organizations



Providing Air Traffic Management Services

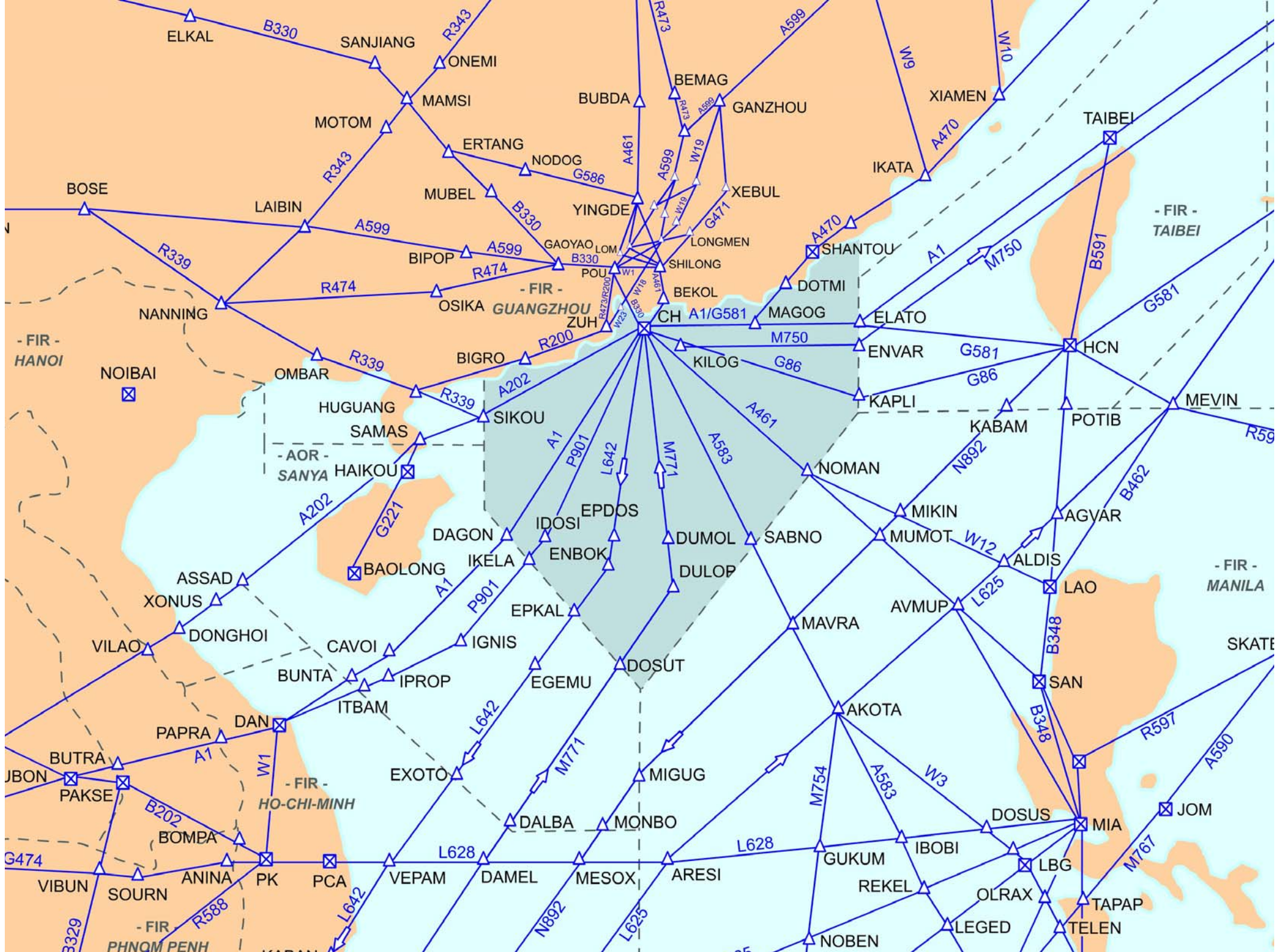
- ATMD of CAD as a service provider for air traffic control
- Maintain a safe, orderly and expeditious flow of air traffic





Two Requirements

- Need to satisfy two requirements:
 - Efficiency of air traffic services
 - No compromise on safety





Two Requirements

- Need to satisfy two requirements:
 - Efficiency of air traffic services
 - **No compromise on safety**





How to achieve
these two
requirements?



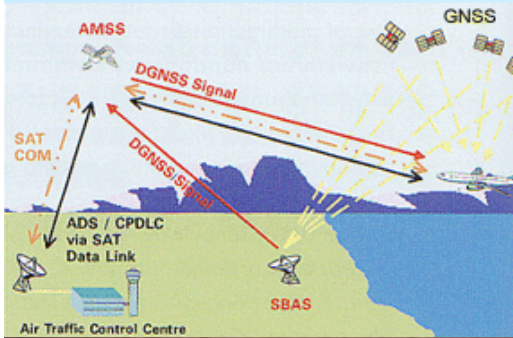
Safety Management on Air Traffic Services

- Proactive risk management
- Establishment and implementation of safety management system



Safety Management on ATS

- To ensure that:
 - Safety responsibilities and accountabilities are defined
 - Safety objectives are formulated
 - ATC systems are maintained and upgraded as necessary to cope with the increasing traffic
 - Suitable workplace environments are provided
 - Standard and competency of ATC controllers are maintained



CAD 670
AIR TRAFFIC MANAGEMENT SERVICES
SAFETY REQUIREMENTS

ATM Standards Office
Flight Standards and Airworthiness Division
Civil Aviation Department
1 December 2004





Safety Management on Airport Operations

- Hong Kong International Airport

- Managed and operated by Airport Authority Hong Kong under an aerodrome licence
- Ensure that airport is safe for use by aircraft



- CAD requires the Airport Authority to implement a safety management system



Safety Performance Target in SMS

- Aircraft ground incidents – not more than 0.04 per 1,000 aircraft movements vs **0.02**
- Birdstrike – not more than 0.05 per 1,000 aircraft movements vs **0.05**
- Foreign objects on ramp – not more than 50 g per 10,000 sqm vs **0.5 g**
- AGL, APA and FGP – target system reliability 99.0% - 99.5%





Promotion of Airport Safety

- Airport Safety Bulletins
- Safety promotion campaigns (such as ramp safety campaign)
- Hazard reporting and registration system



CAD's Role on Safety Management on Airport Operations

- Regular audits and frequent inspections on airfield operational and maintenance activities
- Regular meetings with AAHK such as Aerodrome Licensing Review Committee and Airfield Operations Safety Committee
- Overall assessment on the performance of AAHK prior to licence renewal



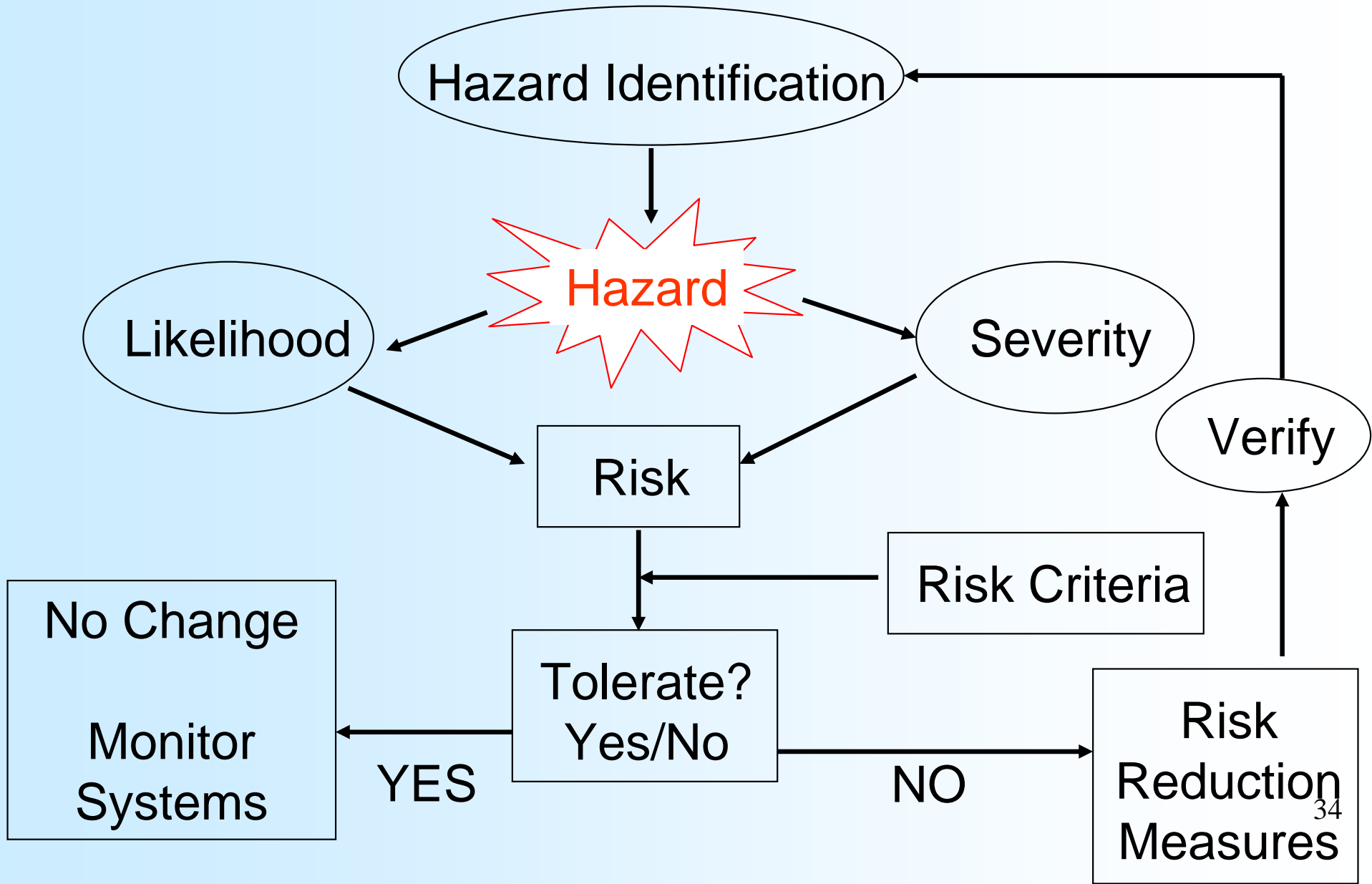


Implementation of SMS Requirements

- ICAO: Set out requirements for safety management system
- CAD: Exercise legal authority in AN(HK)O to regulate the safety management measures of airports, airlines, maintenance organizations and ATS agency
- Each aviation service provider has its unique operating environment and has its own model on SMS (such as TEM Model for flight operations and MEMS for maintenance organizations)



SMS Process





Aviation Safety Management in Hong Kong

Two-pronged approach:

Implementation of safety management requirements by aviation service providers

Monitoring of the implementation process by CAD



Aviation Safety Management





THANK YOU