

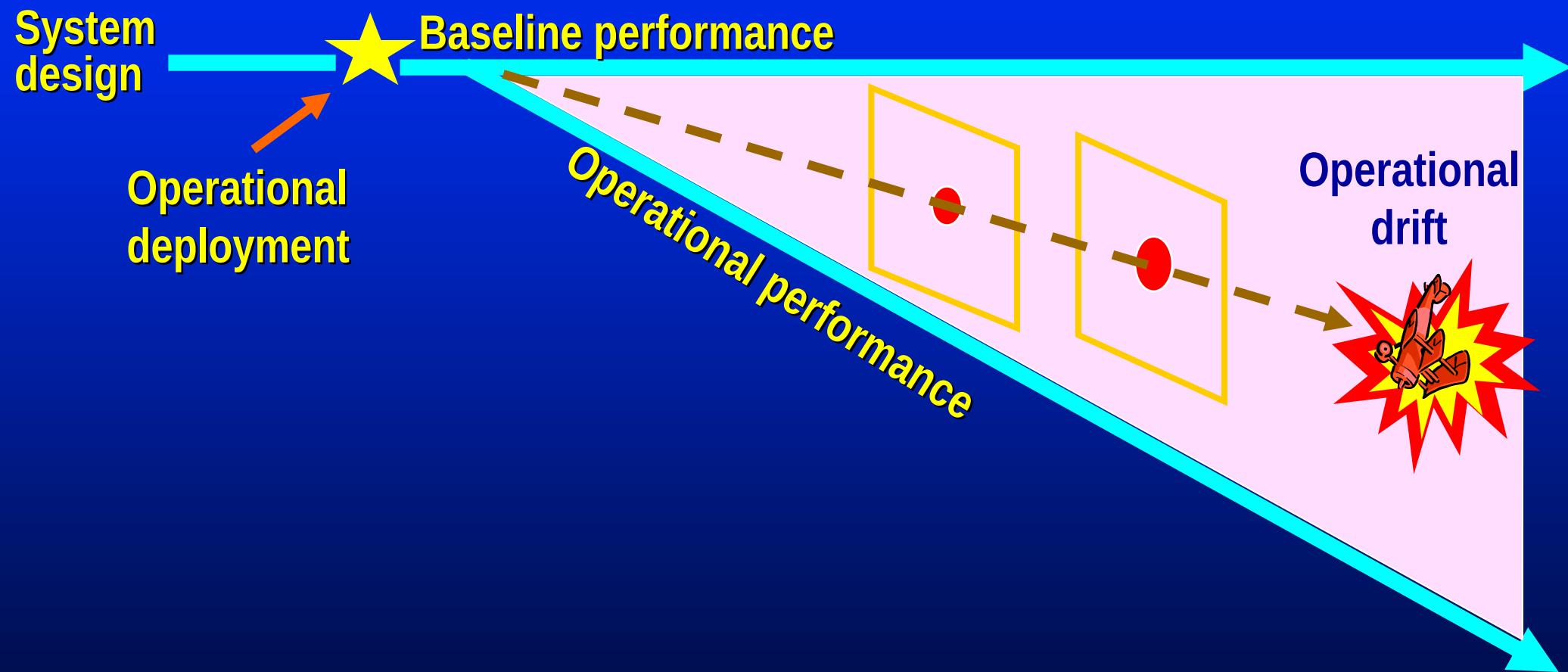
Threat and Error Management, Line Operations Safety Audit y Normal Operations Safety Survey: La perspectiva de la OACI

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SMS – A Tool Box



Learning from Failure & Success



Capturing the Drift

➤ Reactive systems

- ✓ Accident investigation
- ✓ Incident investigation

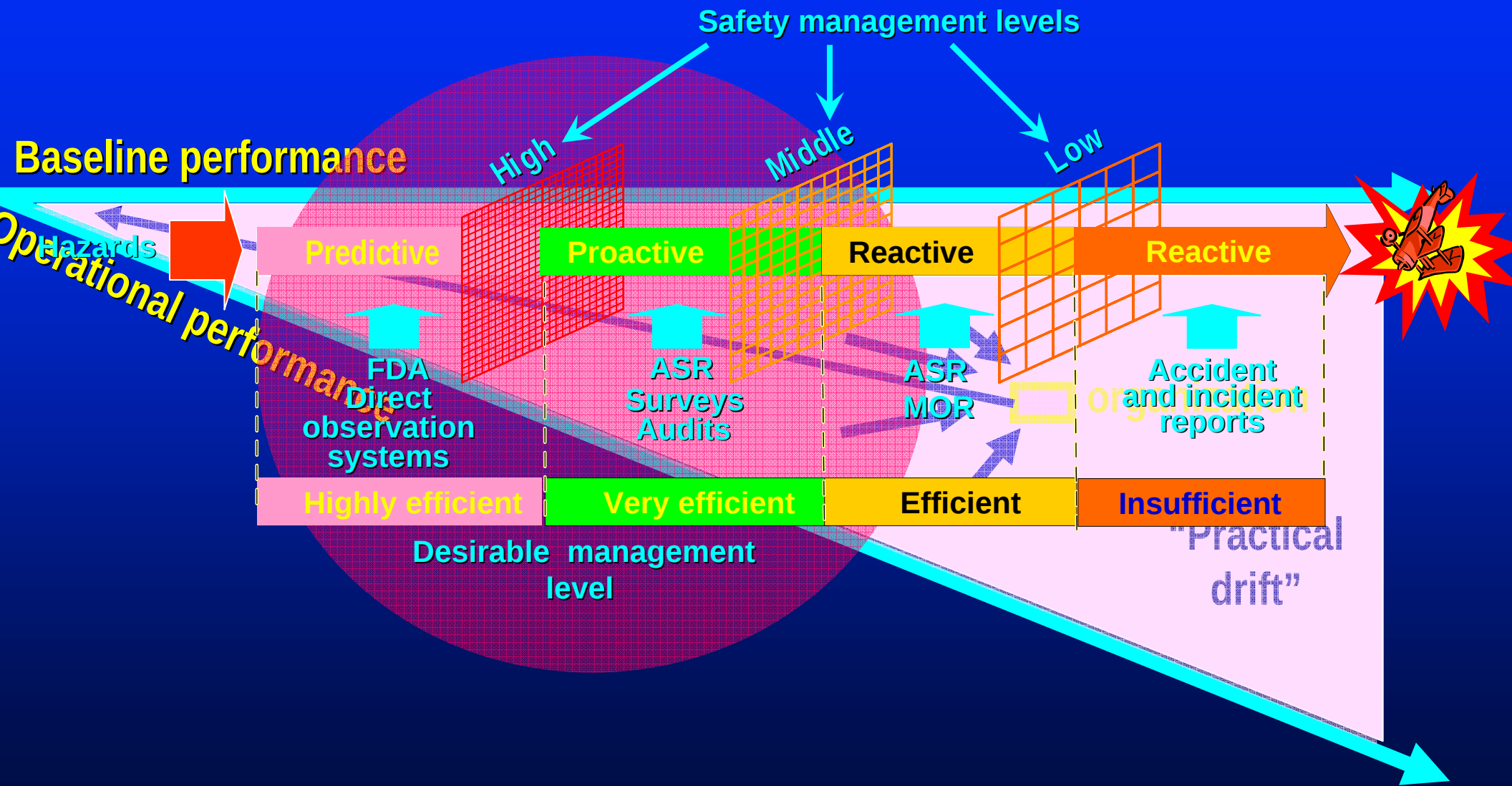
➤ Proactive systems

- ✓ Mandatory reporting systems
- ✓ Voluntary self-reporting systems
- ✓ Confidential reporting systems

➤ Predictive systems

- ✓ Electronic safety data acquisition systems
- ✓ Direct observation safety data acquisition systems
 - ❖ LOSA & NOSS

Safety Data Systems and Levels of Intervention



TEM, LOSA & NOSS – Similar is not the Same

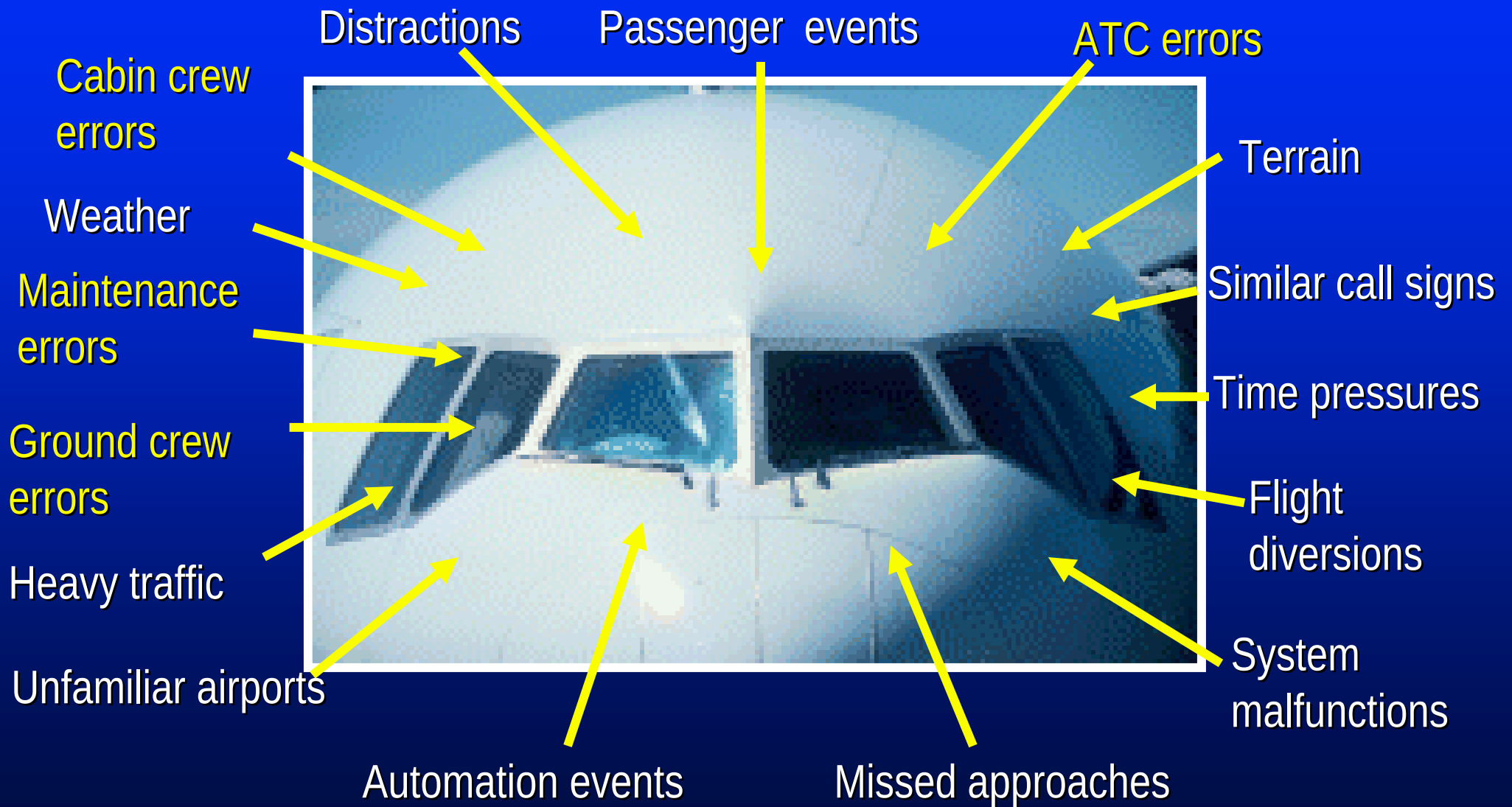
- TEM = Framework – **What** we look for
 - ✓ **Hazards** in operational contexts – **Threats**
 - ✓ **Potential consequence (s)** of the hazards in operational contexts– **Operational Errors**
 - ✓ **Safety risk (s)** of the potential consequence (s) of the hazards in operational contexts – **Undesired States**
- LOSA & NOSS = Tools – **How** we collect what we look for

Threats

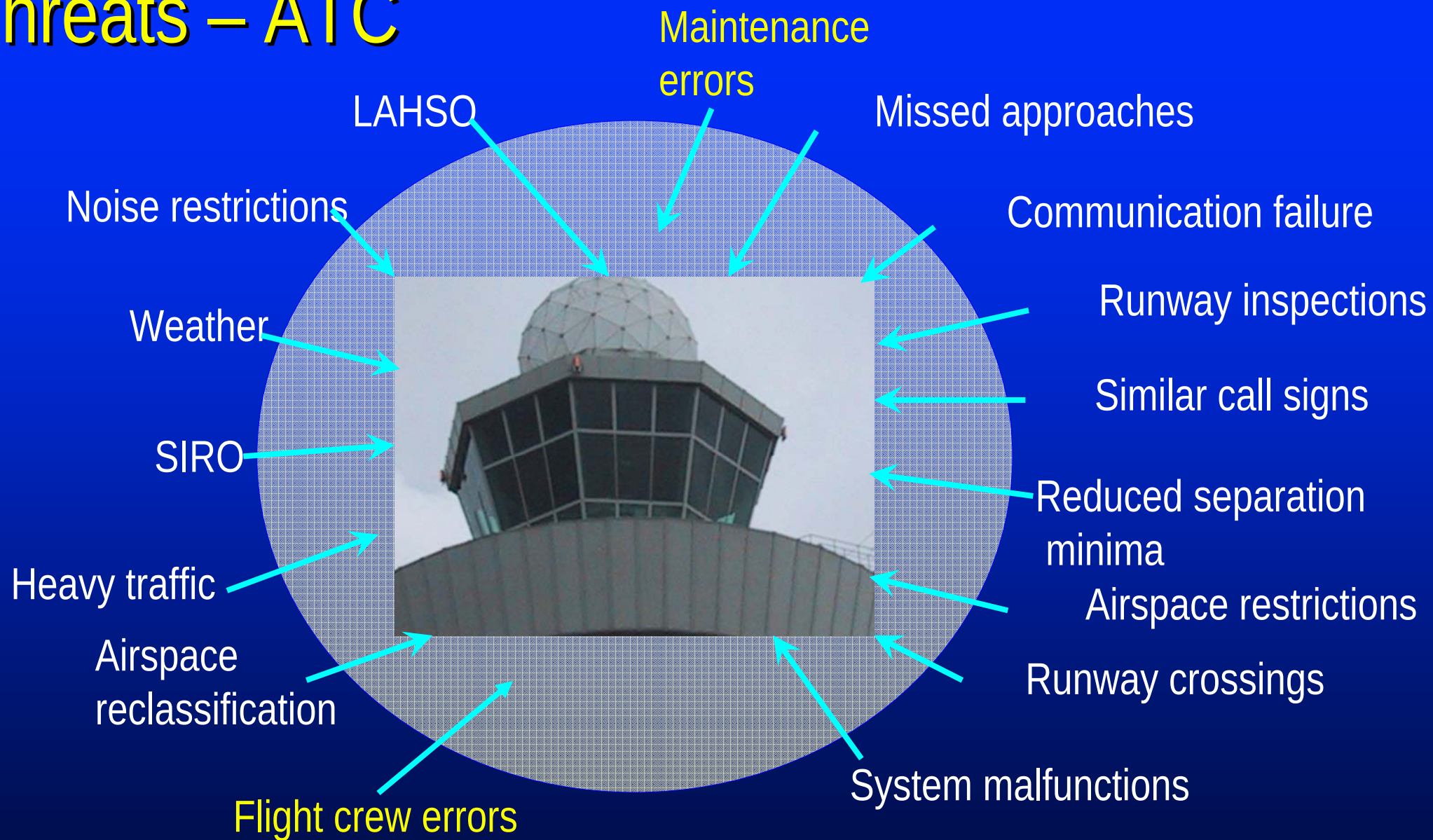
Events or errors that occur **beyond the influence** of the flight crew/ATCO, **increase operational complexity**, and which must be **managed** to maintain the margins of safety

- **Not** flight crew/ATCO errors
- **Not** *[necessarily]* deficiencies in the system
- **Errors by third parties** *[external errors]* are classified as threats to the focus group
 - ✓ Must be managed by the flight crew/ATCO to maintain existing margins of safety

Threats – Flight Deck



Threats – ATC



Errors

Actions or inactions by the Flight Crew/ATCO that lead to **deviations** from organizational or Flight Crew/ATCO **expectations**

- **Equipment handling errors** – incorrect interactions with the equipment
e.g. selecting an inappropriate radar source; making incorrect inputs to an automated system
- **Procedural errors** – deficiencies in execution
e.g. wrong separation minima applied; leaving the position before replacement is ready to take over
- **Communication errors** – deficiencies in the exchange of operational information
e.g. missed calls; misinterpretation of a request

Errors – Flight Crew

- **Handling errors** – deficiencies in stick and rudder skills
e.g. inability to maintain proper speed/configuration during ILS approach
- **Procedural errors** – deficiencies in execution
e.g. correctly selecting an incorrect altitude in the altitude alerter
- **Communication errors** – deficiencies in the exchange of operational information
e.g. misunderstanding an altitude clearance

Undesired Aircraft States

Flight crew induced aircraft states where risk is increased and existing safety margins are reduced

- Lateral deviation
- Vertical deviation
- Speed too high
- Speed too low
- Incorrect aircraft configuration
- Unstable approach
- ...

Outcomes

- ✓ Reportable events
- ✓ Incidents
- ✓ Accidents

Undesired States

Operational conditions where an **unintended traffic situation** results in a reduction of safety margins

- Aircraft climbing to a wrong altitude
- Aircraft turning in the wrong direction
- Aircraft enters a wrong taxiway
- Aircraft missing a crossing restriction
- ...

Outcomes

- ✓ Reportable events
- ✓ Incidents
- ✓ Accidents

As of 23 November 2006

Annex 6 – Operation of Aircraft

- TEM training – requirement for flight crew training, initial and recurrent (Standard)

Annex 1 – Personnel Licensing

- TEM training – Licensing requirement for all pilot and ATCO licenses (Standard)

Annex 6, Annex 11 & Annex 14

- Safety management requirements
 - ✓ The ICAO SMS course (www.icao.int/anb/safetymanagement)
 - ✓ ICAO Safety Management Manual (Doc 9859)
 - ✓ TEM, LOSA & NOSS