Ground Operations

Airside Safety
and
Safety Management System

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in Rzeszow, POLAND

2019

Maciej Danielkiewicz

Threats to Airside Safety

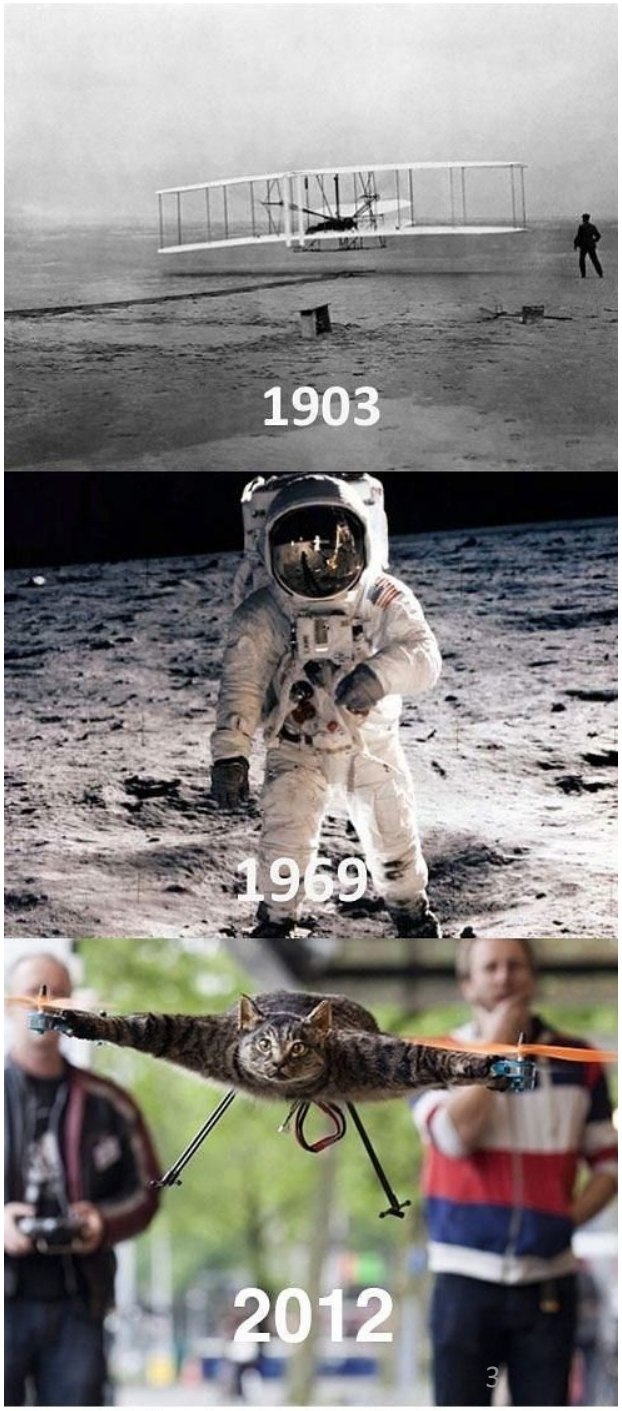
The airside is the most complex area in the airport. The safety of all persons with respect to aircraft operations is of primary concern. Aircraft operations can be threatened by a number of factors, including:

- People who work around the aircraft who operate the GSE.
- Condition of pavement (tarmac) including runways, taxiways, and aprons, due to the presence of standing water, snow, ice, and rubber deposit.
- Obstacles around the airport, including temporary obstacles caused by construction.
- Although not within the responsibility of the Station Manager, broken or damaged ground facilities, such as approach lights, signs, and faded markings on the runways, taxiways and aprons.
- Presence of debris on the runways, taxiways and aprons.
- Bird or other wildlife activity on and near the airport.
- Ground Service Equipment at the airport which is not operated according to the provisions of AHM 630, or is not in proper working condition, which might cause damage if the operator chooses to use it.

While servicing airplanes between flights, operators of most ground equipment must operate in close proximity to the fuselage and wings. Occasionally the aircraft gets bumped or damaged by ground service equipment, most frequently by the passenger boarding bridge, catering trucks, and loading equipment.

Aviation is remarkable for the giant technological leaps it has made over 100 years.

This progress would not have been possible without achievements in the control and reduction in aviation's safety hazards.



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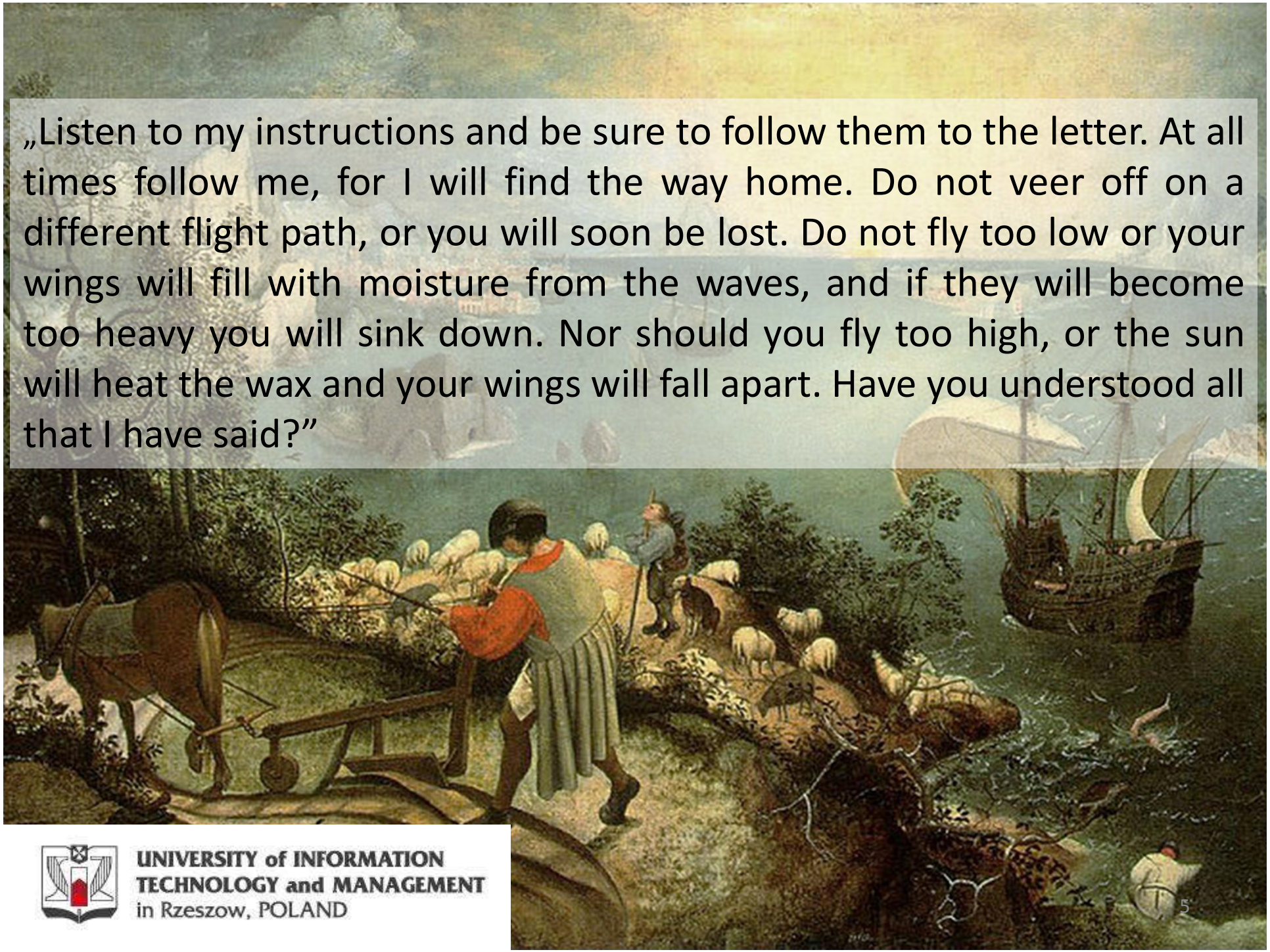
Wright Flyer first flight,

distance 36m,

duration 12 seconds, 3 meters heigh

„Listen to my instructions and be sure to follow them to the letter. At all times follow me, for I will find the way home. Do not veer off on a different flight path, or you will soon be lost. Do not fly too low or your wings will fill with moisture from the waves, and if they will become too heavy you will sink down. Nor should you fly too high, or the sun will heat the wax and your wings will fall apart. Have you understood all that I have said?”



15th June 1785

Jean-François Pilâtre de Rozier
and Pierre Romain

17th August 1908

Lt.Thomas Selfridge

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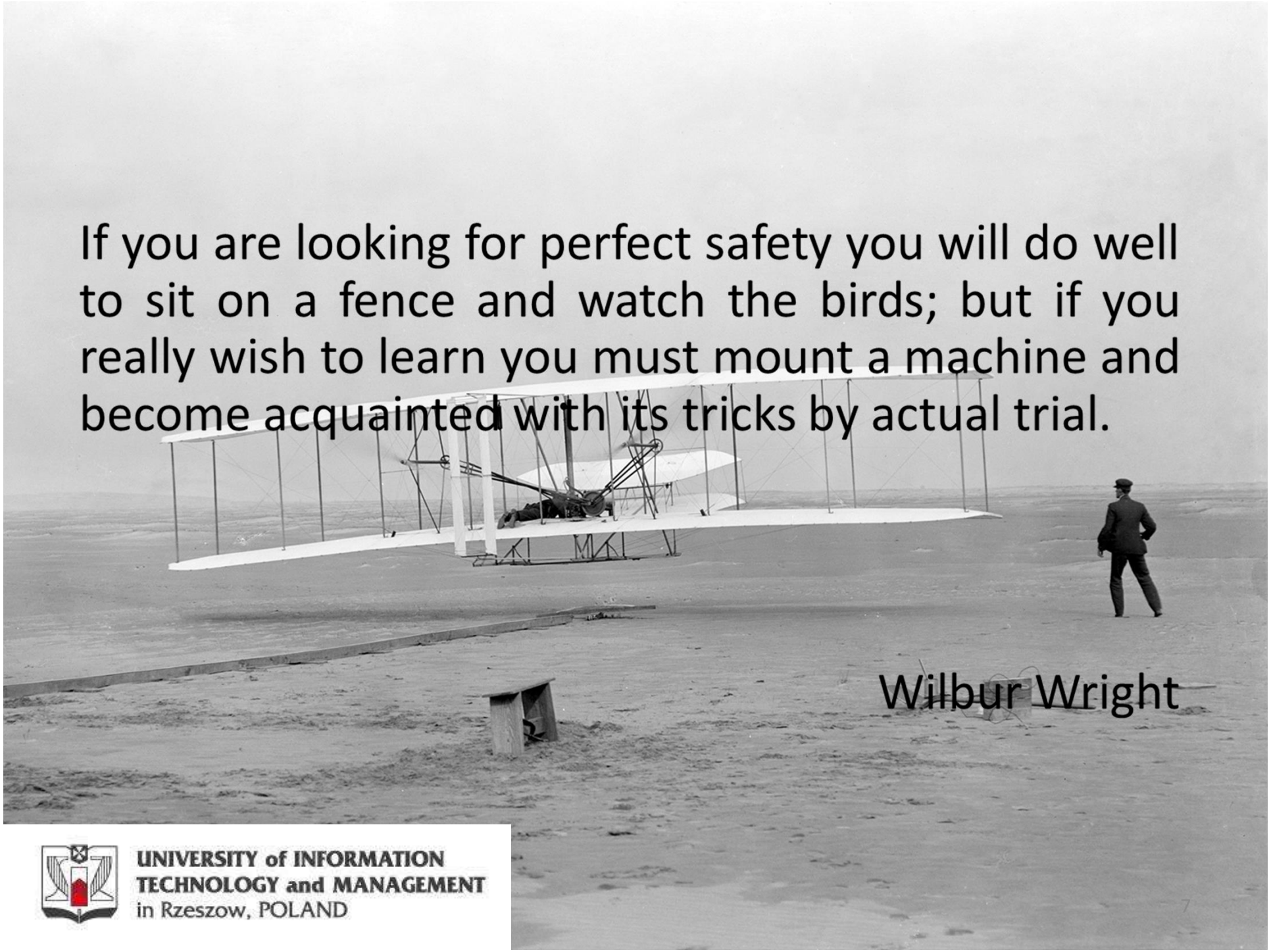
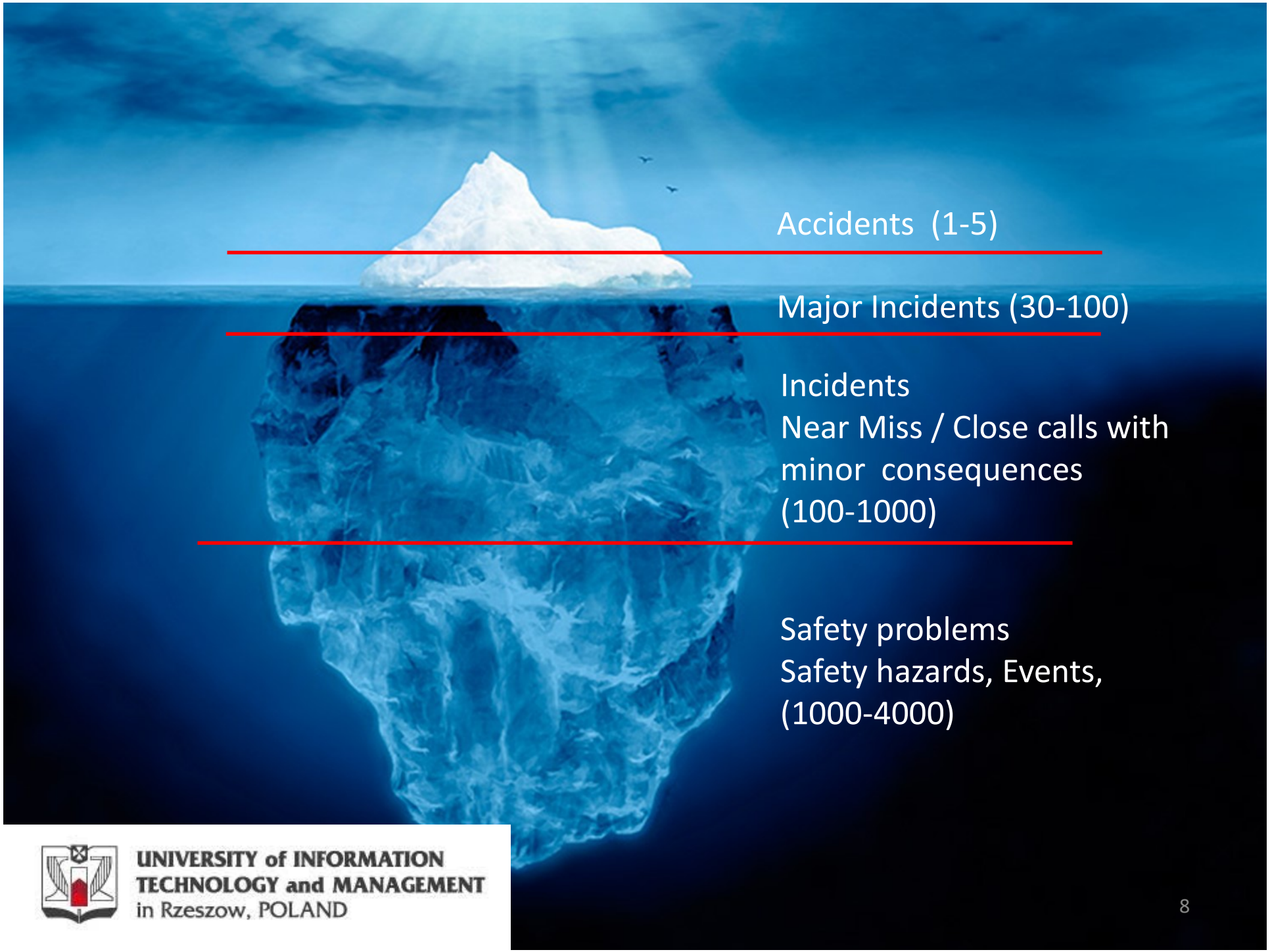

If you are looking for perfect safety you will do well to sit on a fence and watch the birds; but if you really wish to learn you must mount a machine and become acquainted with its tricks by actual trial.
Wilbur Wright



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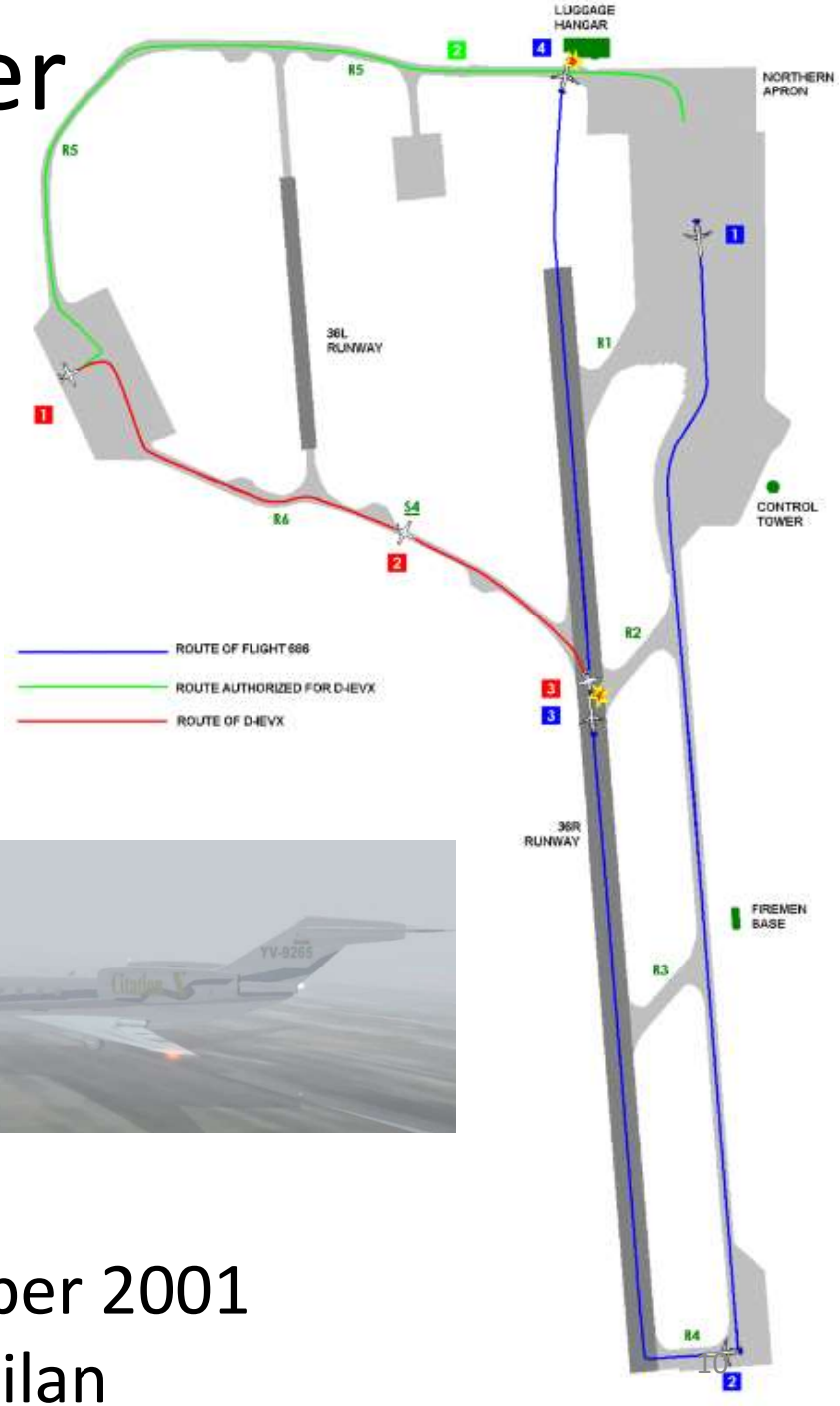
Major disaster

27th March 1977 - Tenerife

Major disaster



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8th October 2001
Linate, Milan

8th October 2001 Linate, Milan

Photograph 6
Marking showing direction TWY R5.

Photograph 7
Marking showing direction TWY R5.

Photograph 8 – Discontinued path marking.

Photograph 11 - Location sign at TWY R5 entrance (exiting West apron).

Photograph 12 entrance

Photograph 9 - S4 marking and ICAO pattern B runway - holding.

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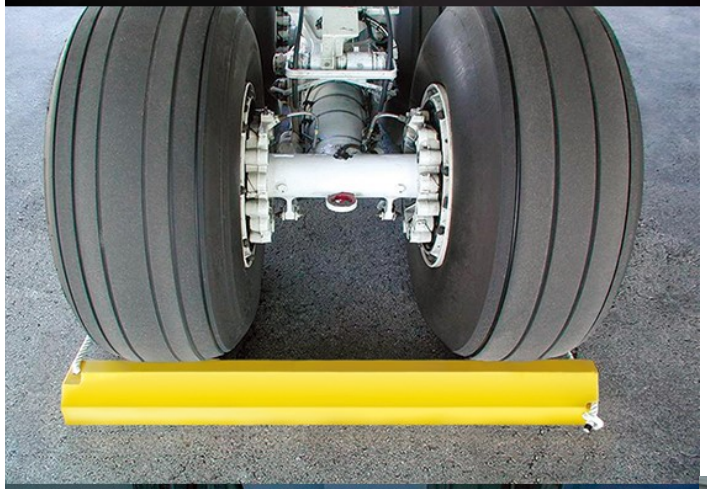
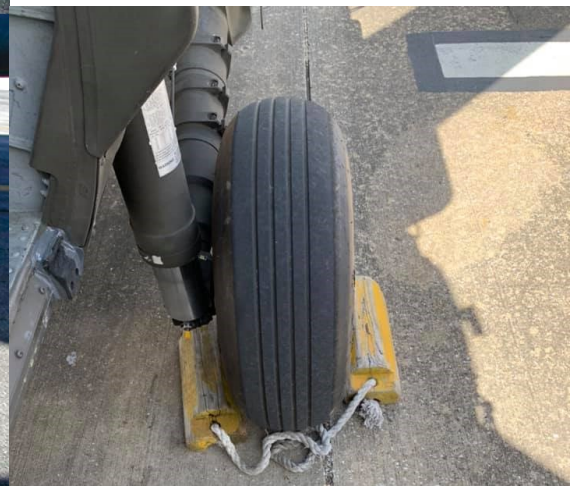
How close are we actually to major air disaster?

Why safety in aviation is important at each stage of the „aviation industry”?





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Chocks

Used to prevent a parked aircraft from movement

Usually placed in front and back of the wheels or landing gear

Lack of chocks – an event or an accident?

Chocks releasing

Lack of chocks?

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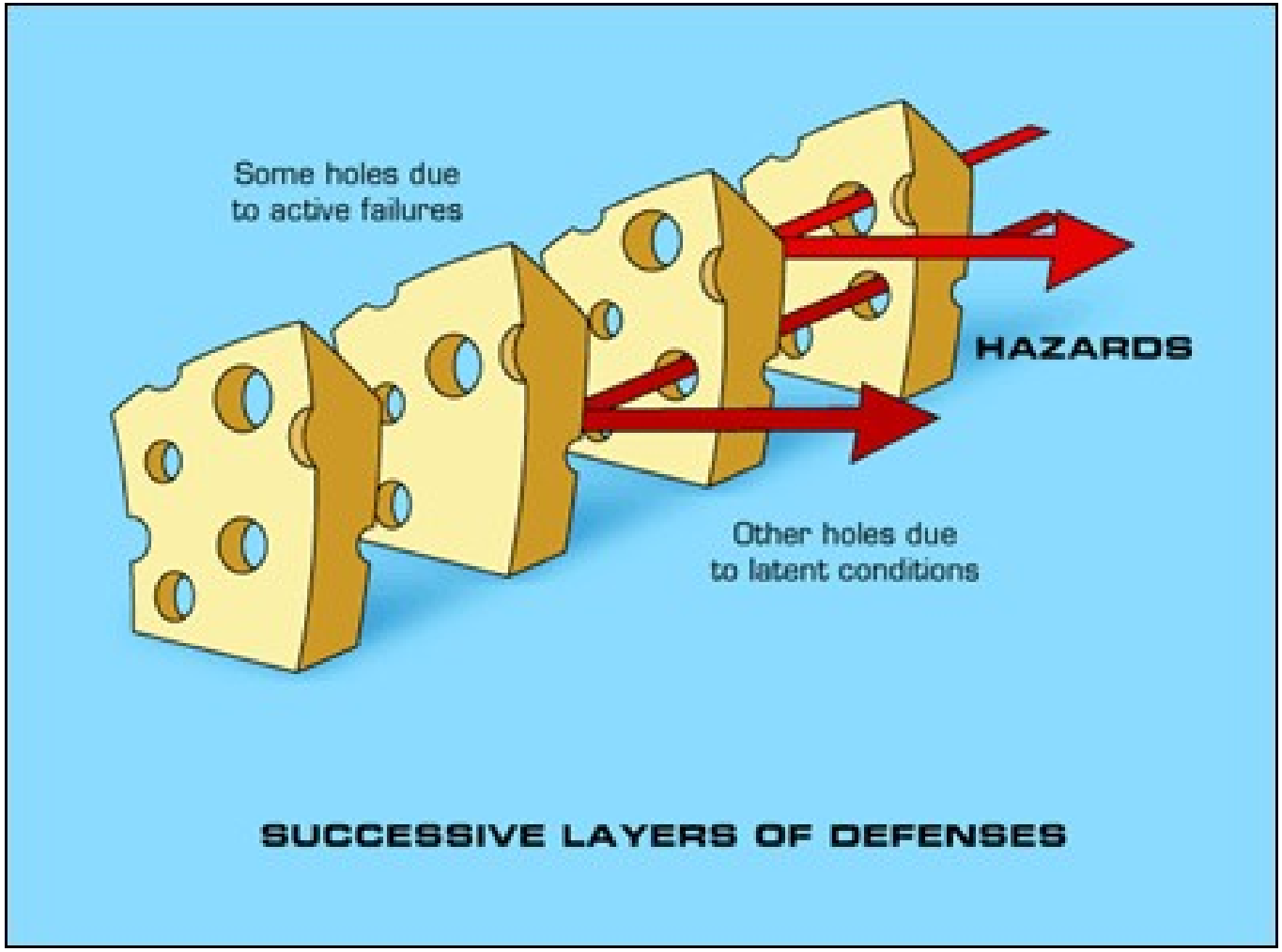
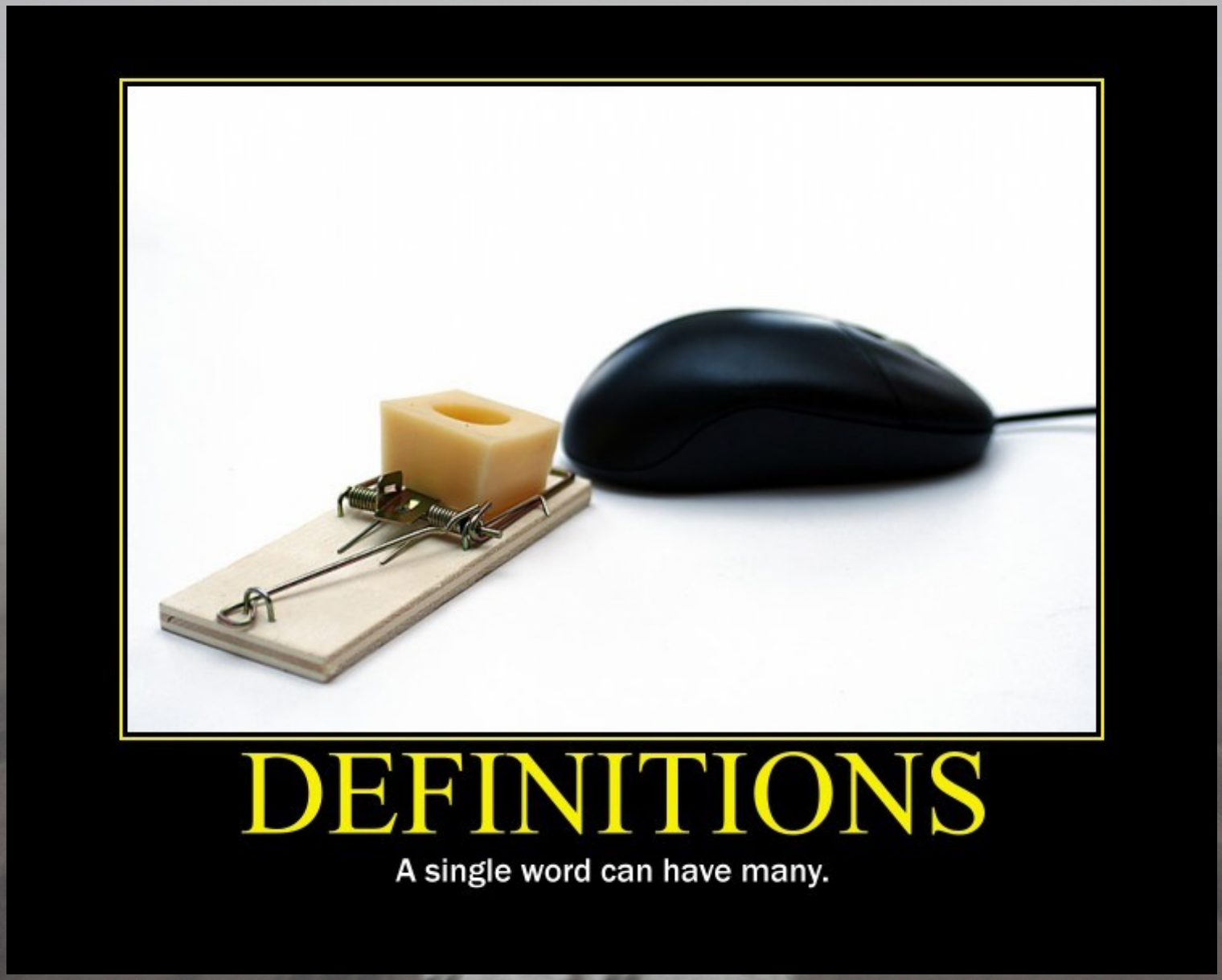
https://aviation-safety.net/database/record.php?id=20080202-2

Swiss Cheese – James Reason's Model



Know your work environment well, use all the „safety barriers”

Safety barriers are made to protect you and other people, not to annoy all of you.

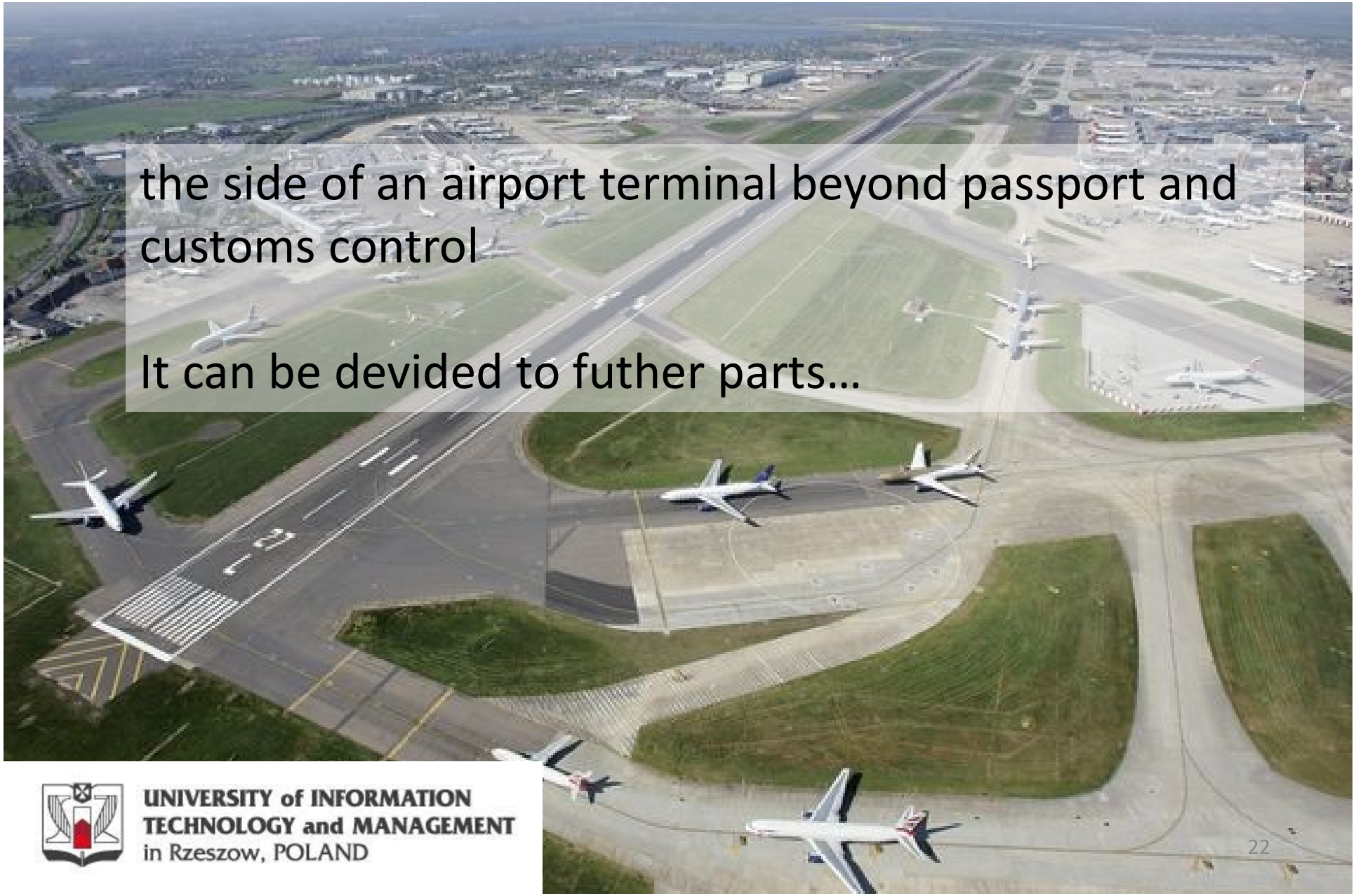

DEFINITIONS
A single word can have many.

Basics – the alphabet

Basic Definitions - Landside

the side of an airport terminal to which the general public has unrestricted access

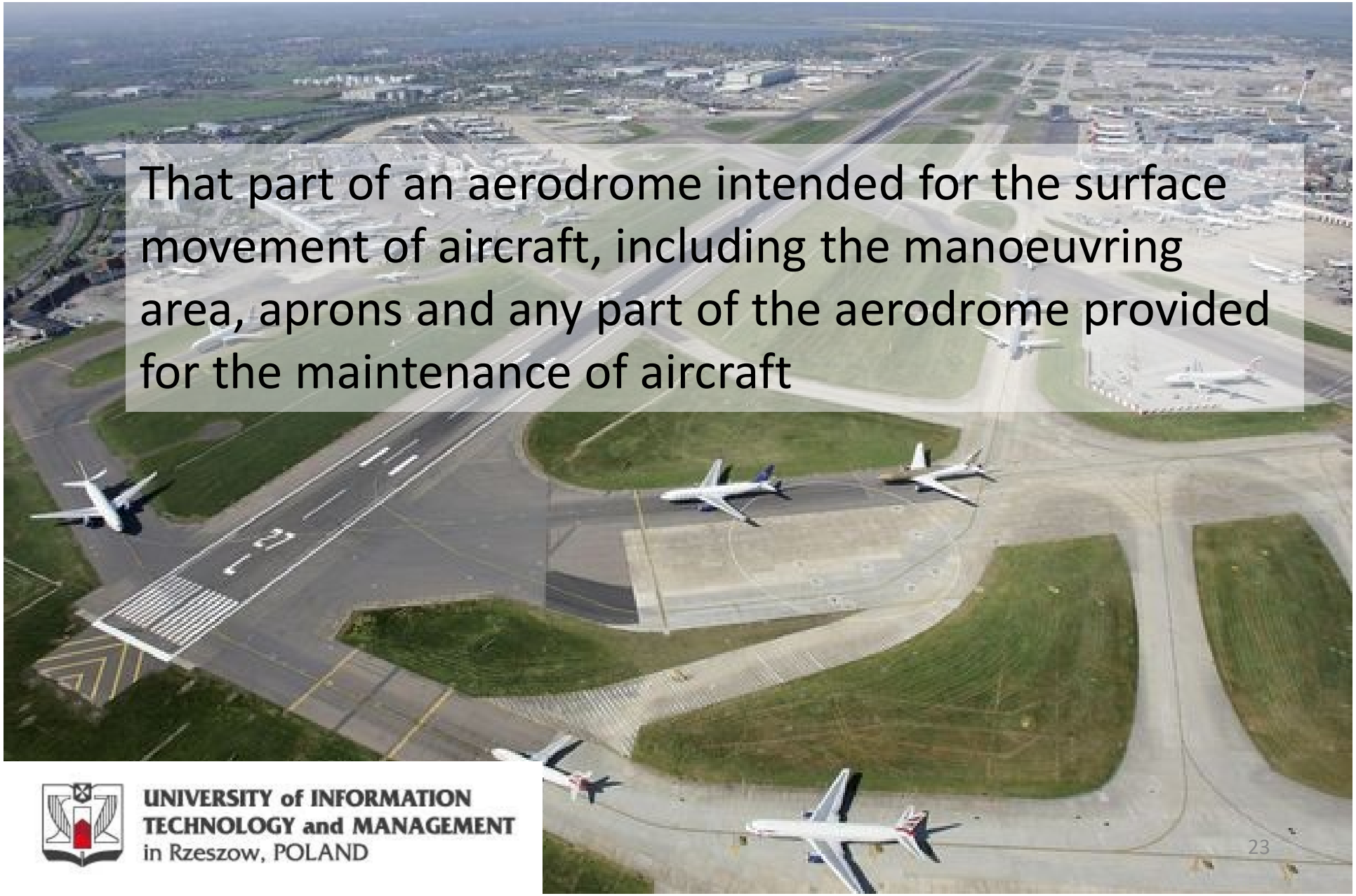
Basic Definitions - Airside



the side of an airport terminal beyond passport and customs control

It can be devided to futher parts…

Basic Definitions – Movement Area



Basic Definitions – Maneuvering Area

That part of an aerodrome provided for the take-off and landing of aircraft and for the movement of aircraft on the surface, excluding the apron and any part of the aerodrome provided for the maintenance of aircraft.

Apron

A defined area on a land aerodrome provided for the stationing of aircraft for the embarkation and disembarkation of passengers, the loading and unloading of cargo, and for parking.

Service roads

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Taxiway (TWY)

A defined path on a land aerodrome established for the taxying of aircraft and intended to provide a link between one part of the aerodrome and another, including:

a) Aircraft stand taxi lane - . A portion of an apron designated as a taxi route intended to provide access to aircraft stands only.

b) Apron taxiway - A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.

c) Rapid exit taxiway - A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimising runway occupancy times.

d)

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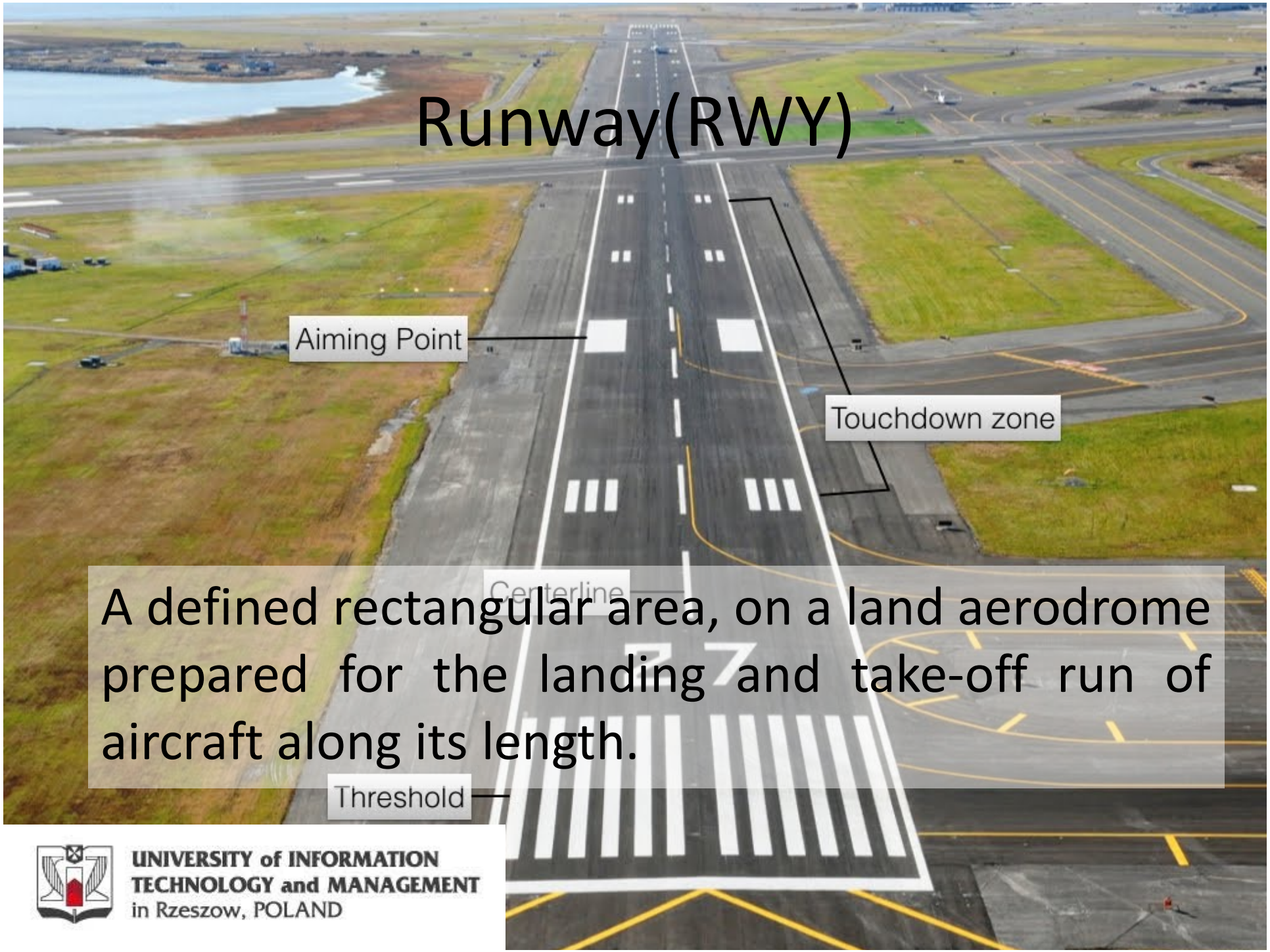
Runway(RWY)



A defined rectangular area, on a land aerodrome prepared for the landing and take-off run of aircraft along its length.

Runway safety areas

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Airside threats

Airport is dangerous!!!

- Vehicle movements, including Ground Service Equipment
- Predestrian movements (passangers, foot traffic of ground personel)
- Aircraft movements
- Jet engines
- Propeller engines and helicopters
- Aicraft antennea and other protrusions (i.e. low aircraft wingtips)
- Aircraft fuelling and fuel spills
- Adverse weather and low visibility conditions (storms, fog, high winds, dust, snow, ice etc.)
- Night operations
- Working at height (aircraft doors i.e B747 and A380)

Runway Incursion

Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take off of aircraft

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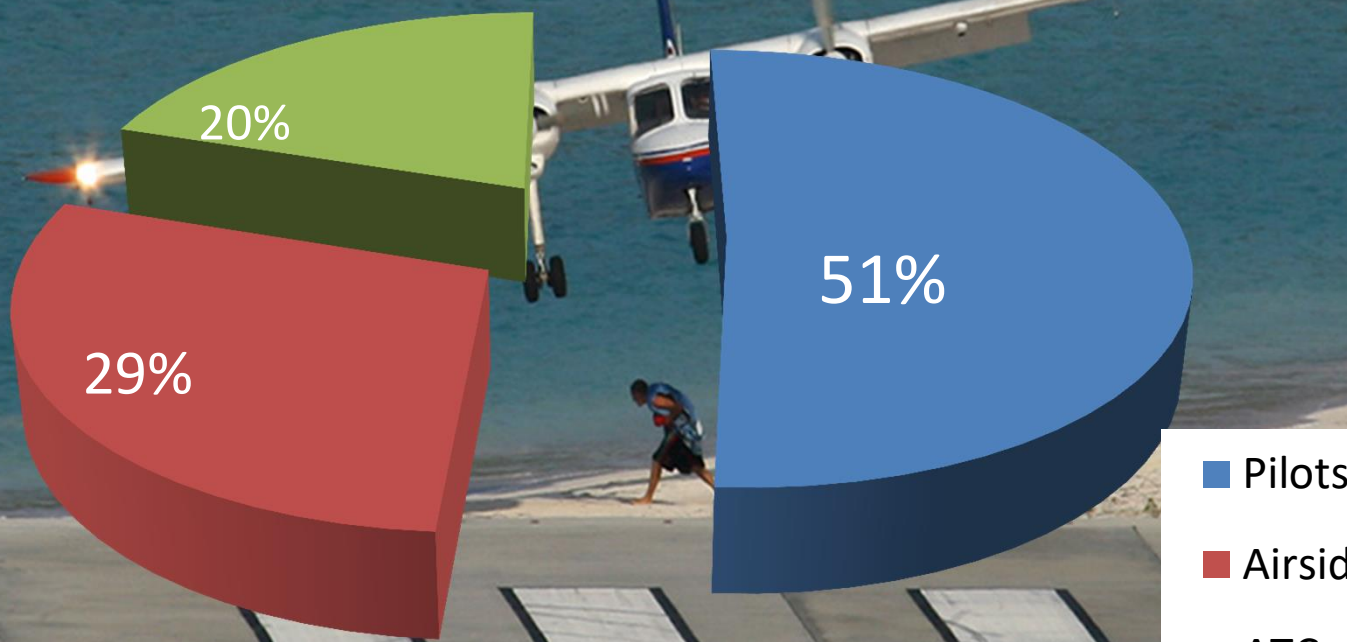
Runway Incursion

Responsibility for RI



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The roots of Runway Incursions

- Mishaps in radio communication
- Obstacles – obscuring the view or causing the traffic to go through the runway
- Wrong/misleading procedures
- Not compliant lights, markings
- Adverse weather conditions (fog, mist, rain)
- Complicated airport layout

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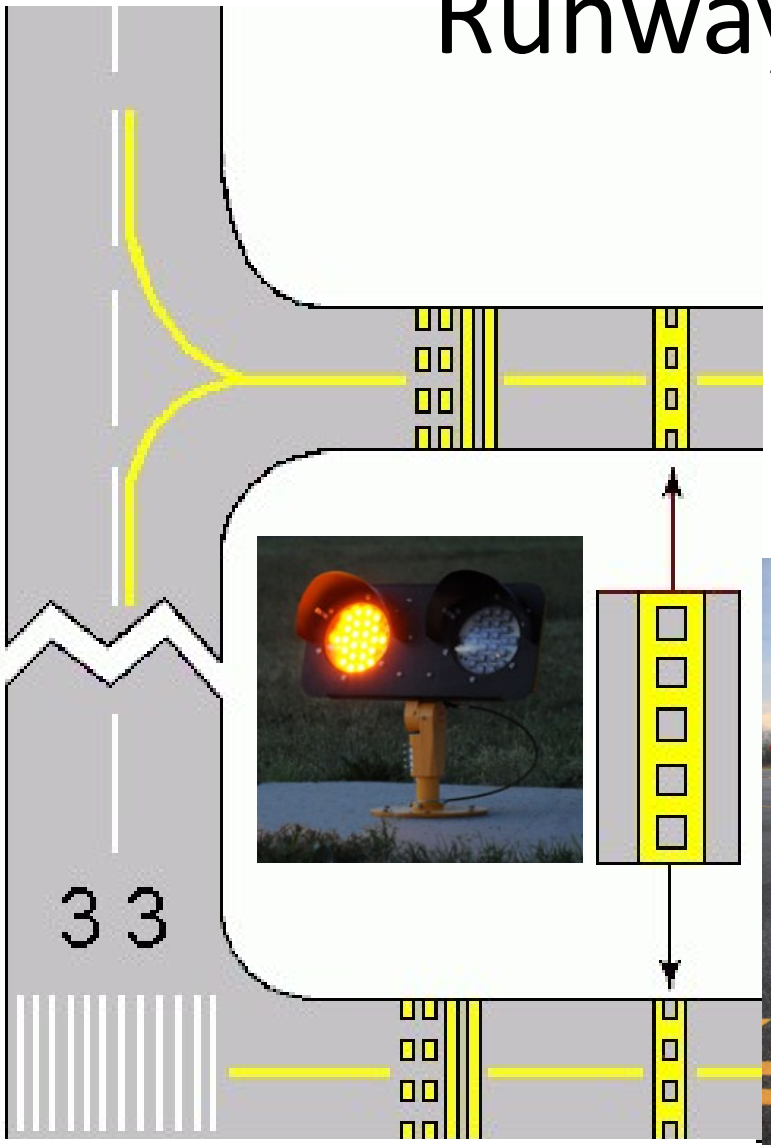
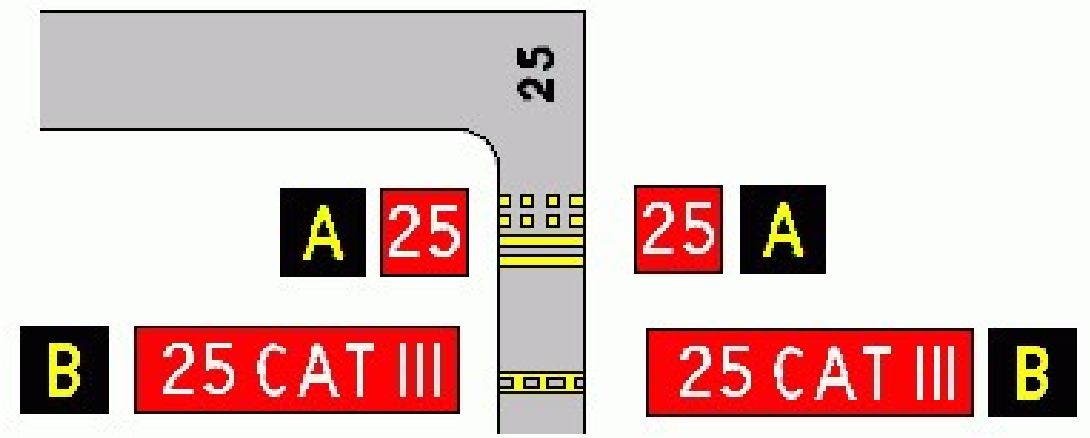
Runway Holding Point





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Runway Holding Point

How to avoid RI's

- Know your airport well, have an airport diagram
- Plan your way, pay attention to holding points and procedures,
- Pay attention to markings, singnage and lights
- Follow the communication procedure
- If you have doubts about your position or received instructions – stop and ask!!!

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Vehicle movements

Aircraft usaully have a right of way

Always use speciale care and attention when manoeuvring around aircraft.
Otherwhise, the likely result is injury to people and damage to aircraft or equipment.
Although it might look easy, in fact it is very serious operation

Follow me – right of the way :
https://www.youtube.com/watch?v=5iTkJvoYOT8

Pre-Operational GSE Safety Checklist

According to the IGOM Basic Operating Requirements for Ground Service Operators (GSO) it is important to check all GSE involved in aircraft handling at the start of a shift (at least once per day). A "walkaround" should be performed to assess the condition of the GSE.

The use of a checklist during the pre-operational check ensures that the operator assesses all areas of the GSE and that no areas are forgotten or omitted. Items that a Station Manager could incorporate into his station's pre-operation checklist are:

- Check the vehicle starts and runs properly.
- Remove F.O.D. (Foreign Object Debris), which is any litter or debris on the ramp that could be sucked into an aircraft engine and cause damage. Place in an FOD bin.
- Check lights, indicators, anti-collision beacon.
- Check tire pressure and wear.
- Check window wipers.
- Check rear view mirrors are not damaged and are set so you can see them.
- Check for any damage.
- Check that a suitable and certified fire extinguisher is fitted.
- Check the boom goes up and down.
- Check the conveyor operates forward and backwards properly.
- Check the Hand/Side rails are in position and operative.
- As you pull away, check the brakes are working properly.

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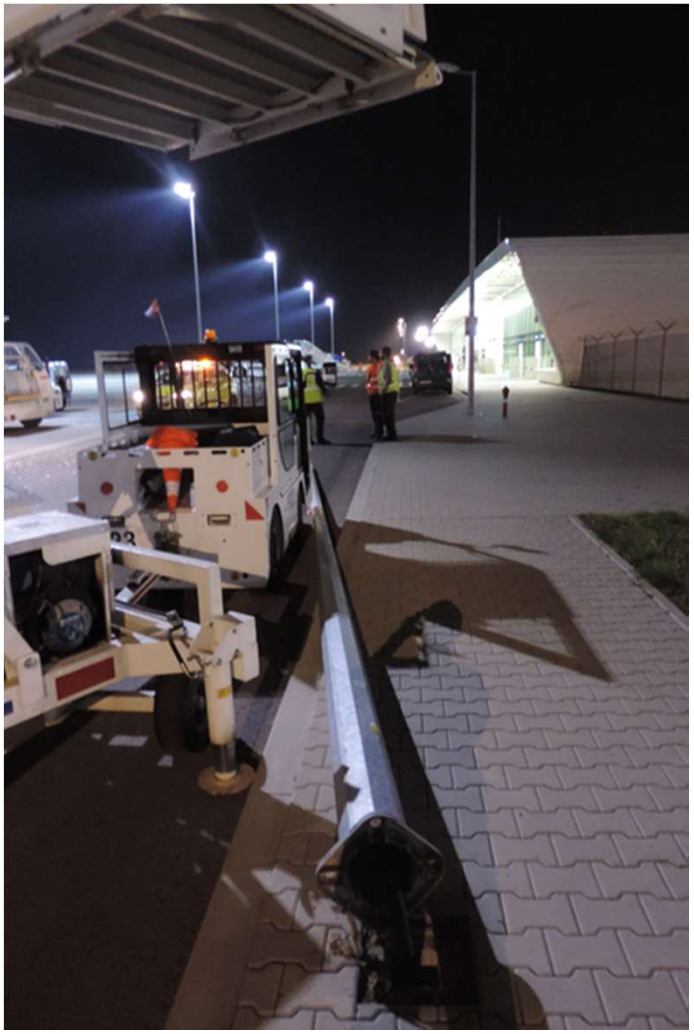
Vehicle movements



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Vehicle movements

Pedestrian movements

2 seconds for unnattaded passenger:

a) Shortening way
b) Making his own show

Aircraft movements

Bell

Apron push

B747

Aircraft movements – jet engines

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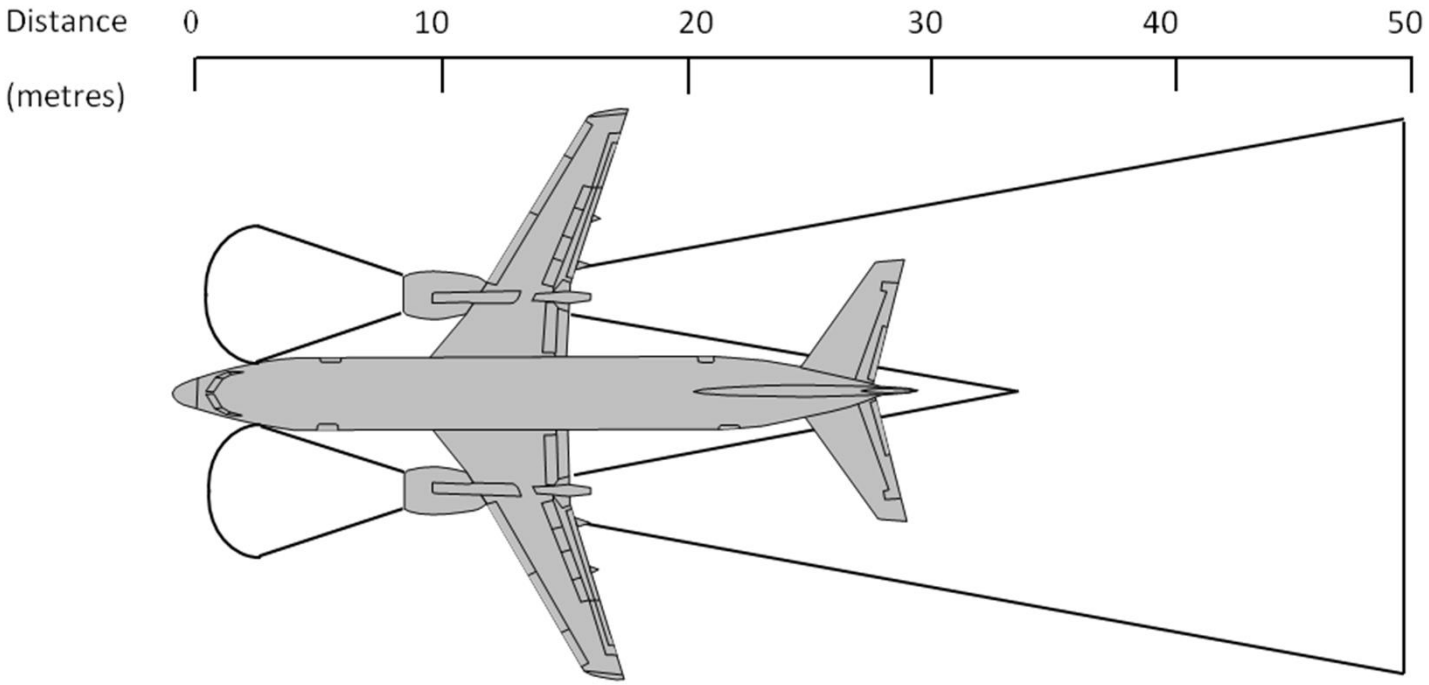
Aircraft movements – jet engines

Aircraft have specific danger areas that represent significant threats, particularly around the intake and the exhaust.



Typical Aircraft Danger Areas

[Tests](#) A319

Test [747](#)

Vintage [test](#)

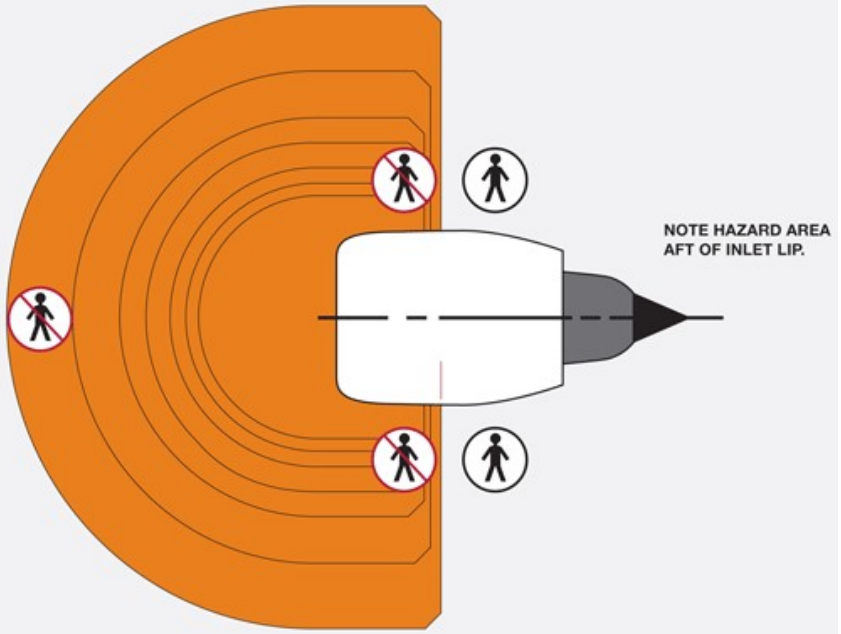
[Skhiatos](#)

The fact that few serious jet blast incidents and accidents occur during millions of ground operations annually is a tribute to the training and professionalism of air carrier flight and ground crews, and to the continual care they exercise in ground operations.

Aircraft movements – jet engines

[Snow]
[ULD]
[Aircraft Carrrier]

INLET SUCTION FORCES ARE HARDLY NOTICE-ABLE BEYOND THE INLET HAZARD AREA BUT INCREASE DRAMATICALLY WITH EACH STEP INTO THE HAZARD AREA.



BE AWARE OF ENGINE INLET HAZARD AREA. ONE MISSTEP INTO THESE AREAS AND IT MAY BE YOUR LAST.

DO

- Do know the proper hazard areas as stated in the maintenance manuals.
- Do secure loose items on person or remove them.
- Do tread carefully, guard against tripping or stumbling.

DO NOT

- Do not wear loose clothing.
- Do not attempt to retrieve items in hazard area.
- Do not gesture with arms.

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Aircraft movements – propellers

Rule number one:

Keep away from spinning objects!!!

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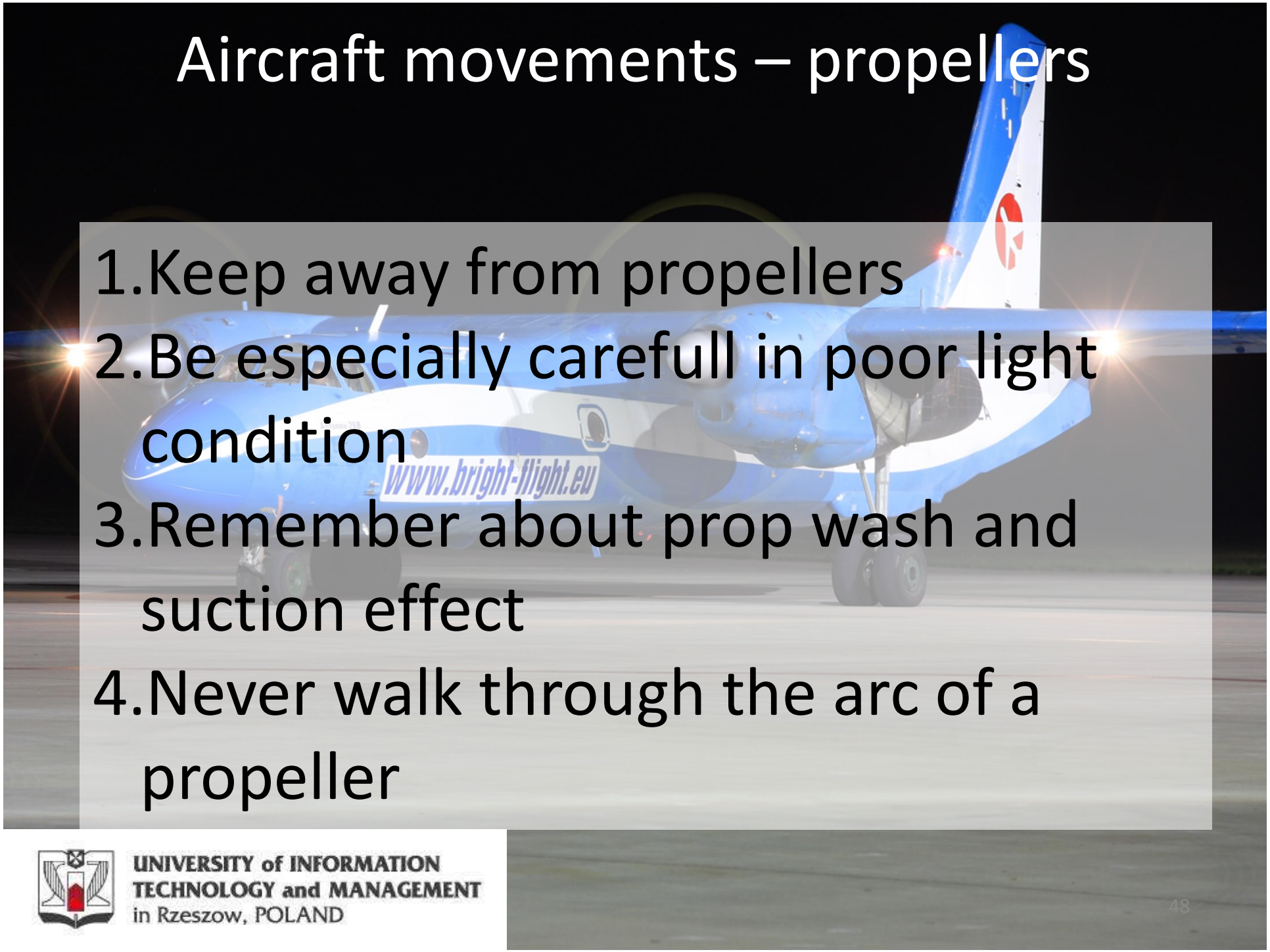
Aircraft movements – propellers



1. Keep away from propellers
2. Be especially carefull in poor light condition
3. Remember about prop wash and suction effect
4. Never walk through the arc of a propeller

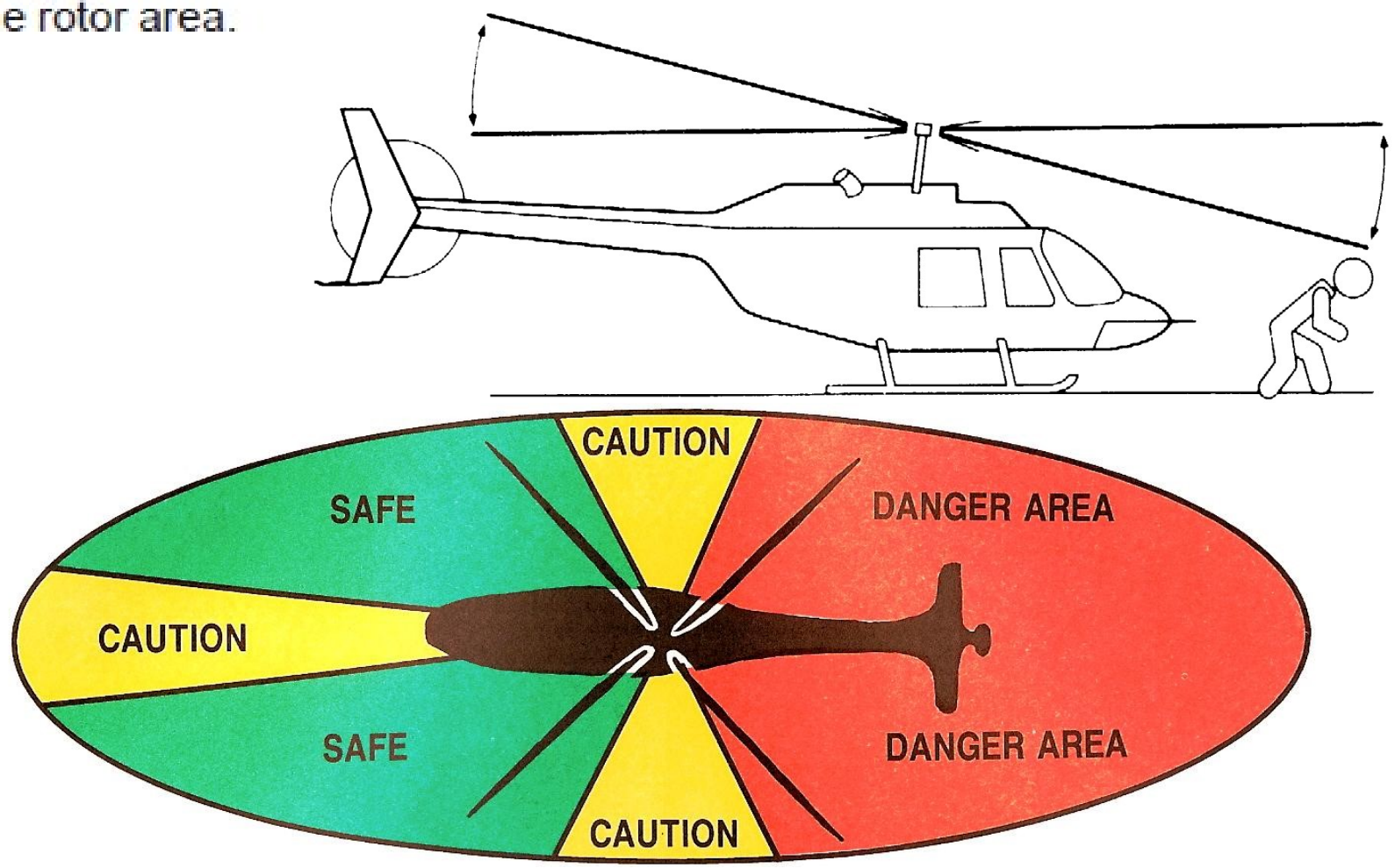
Aircraft movements – propellers

Even slowly spinning blades can cause harm!

ATR „hotel mode”

Aircraft movements – propellers

If you have not been trained, do NOT approach a helicopter with its rotors turning on foot or in a vehicle. The main *hazard* areas are forward and aft of the rotor area.



Pasadena Police

„FOD”
- Foreing Object Debris/Damage

FOD – serious threat to the safety of personnel, aircraft, equipment and property.

CDG 25 July 2000

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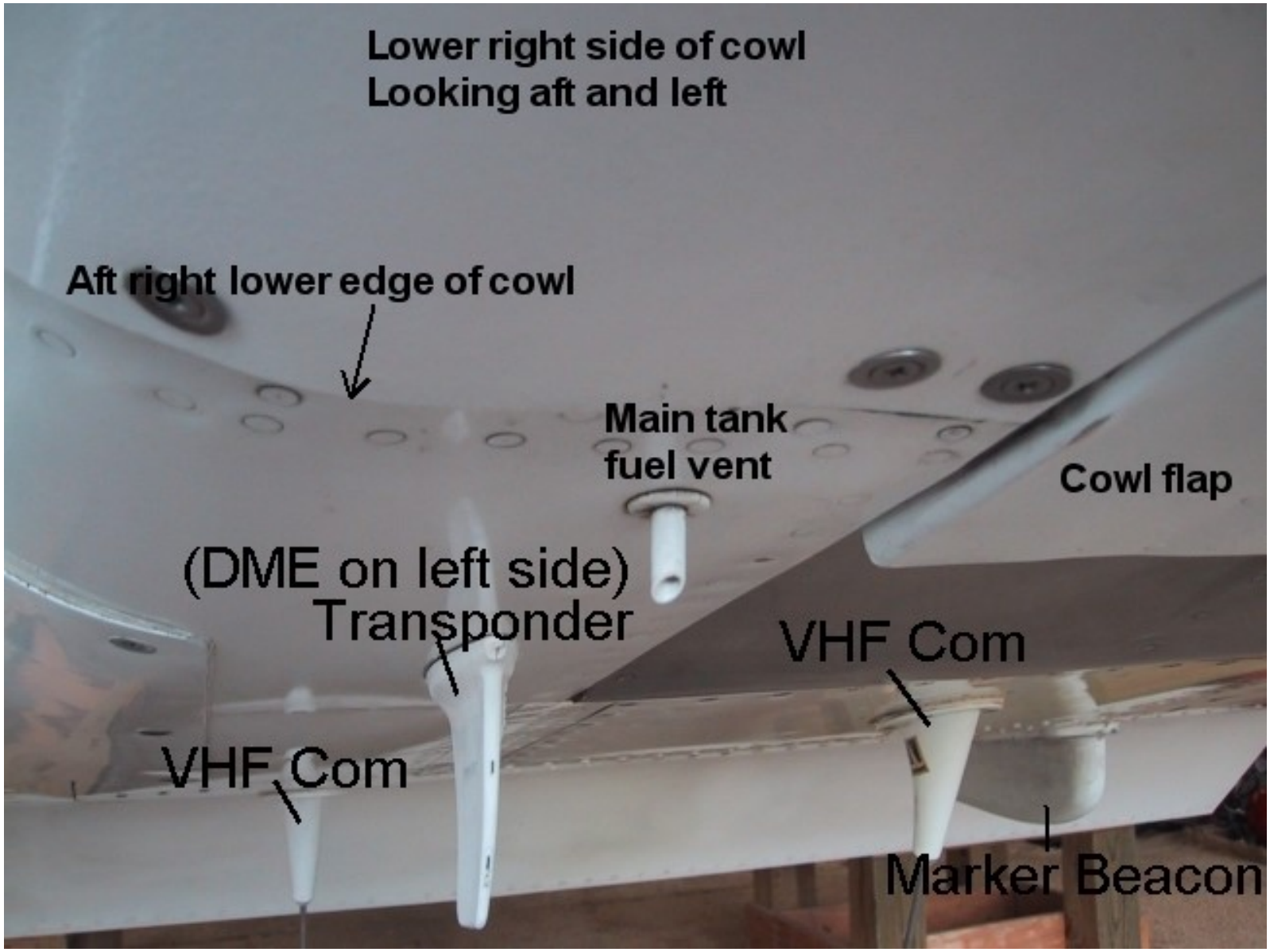
Aicraft antennea and other protrusions



Aicraft low aircraft wingtips

Aircraft fuelling and fuel spills

Aircraft Refueling Safety

Aircraft refueling represents a situation where extra care must be taken due to the risk of fire and its consequences.

Performing any aircraft refueling operation can be very dangerous and special precautions must be in place to accommodate this activity, such as:

- Keep well away from the refueling vehicle and don't drive near the fuel hose and the bonding cable and the aircraft fuel vents (3 m or 10 feet).
- There is a fire hazard due to fuel vapors, so do not connect or disconnect electrical equipment (such as GPU or FEP) while the aircraft is refueling.
- Keep Personal Electrical Devices (PED's) for example mobile phones (i.e., cell phones), pagers, and radios away from the refueling vehicle and fuel vents (3 m or 10 feet).
- If there is a fuel spill, shut off the GPU or FEP and all electrical equipment immediately.
- Each trailer tank or towed service must remain coupled to their tractors.

Aircraft Refueling Safety

- The aircraft and the fuelling vehicles must be electrically bonded together throughout the fuelling operation to ensure that no difference in electrical potential exists.
- If the bonding cable connecting the fuelling vehicle to the aircraft becomes disconnected during ground operations the fuel operator must be immediately advised.
- Access to the hydrant emergency stop button must be visible and clear of obstruction.
- A lanyard must be attached to the hydrant pit valve and be readily accessible.
- The hydrant pit valve shall be identified by a four winged flag or equivalent and clearly visible to other ground equipment handlers
- Minimise length of hydrant inlet hose to limit the exposure of the hose to damage.
- The fuel operator must maintain control of fuelling operations using the hand held deadman device throughout the operation, remaining outside the vehicle cab at all times.
- Fuelling vehicles and equipment must have hoses of sufficient length to allow the fuelling platform to be fully lowered whilst the hoses/couplings are connected to the aircraft fuelling manifold.

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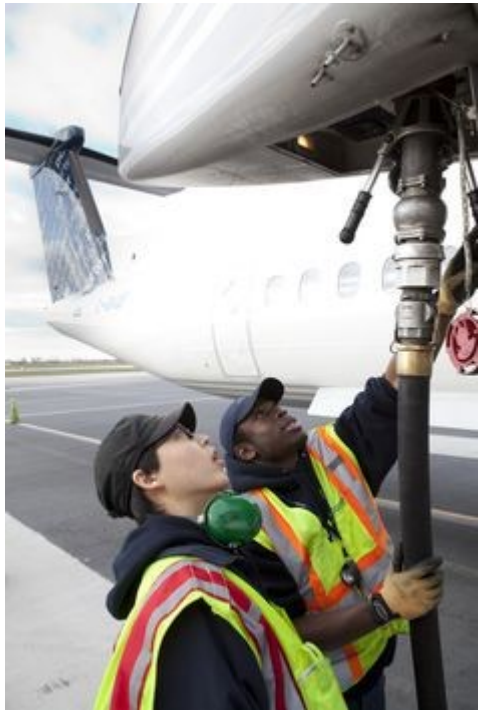
Aircraft Refueling Safety

- Extreme care must be taken to position refueling vehicle and equipment correctly, ensuring that strain is not applied to the fuelling hoses, coupling and manifolds on the aircraft when the platform is lowered.
- Vehicles must be designed to ensure that the fuelling hoses cannot become entangled on equipment during movement of the fuelling vehicle's platform.
- Platforms must not be raised or lowered while fuelling operations are taking place.
- When raising the lift platform of fuelling vehicle, care must be taken to ensure that it does not touch any part of the aircraft.
- The fuel operator should conduct a final walk around the vehicle before leaving the aircraft to ensure all hoses have been disconnected and stowed correctly.
- In the event that fuelling must take place with one aircraft engine running:
  - Fuelling shall be performed at the opposite side from running engine
  - Passengers shall not remain onboard the aircraft and
  - No other servicing activities shall be undertaken until fuelling has been completed.



Note: The latest AHM 630 should be consulted for current recommended practices.

Fueling with Passengers on Board

While fuelling of an aeroplane is a routine activity, it may nonetheless result in a major catastrophe with passengers on board if adequate care and precautions are not taken by the operator. One of the safety precautions is that the "seat belt ON" signs are kept "OFF".

When passengers are on-board during the refueling process there are additional safety procedures:

- The crew must be told when refueling is about to commence and when it is completed.
- All passenger exits are to be kept clear. Catering and cleaning activities are to be kept clear of exits.
- The area around the bottom of passenger steps is to be kept clear.
- There must be steps and/or an airbridge on both the forward and the rear passenger doors.

FR Bulletin

Fueling with no Crew Onboard

Occasionally fueling will take place with no crew onboard (prior to their arrival at the aircraft). If the crew are present they will normally man the aircraft doors and adopt specific procedures. However, in cases where they aren't present personnel such as aircraft cleaners, caterers and engineers may be working inside or around the aircraft during fueling and potentially be at risk.

It is essential that formal procedures and where necessary training is undertaken for these situations to ensure that a safe evacuation can take place if required. Training would normally include operation of aircraft doors and emergency chutes where required.

The Station Manager should ensure that this is sufficiently covered and risk mitigated as much as possible.

Emergency Fuel Shut-off

Hydrant systems shall be provided with pump emergency fuel shut-off (EFSO) buttons.

These shall be clearly identified, made of reflective material and located such that they are visible and easily accessible from all aircraft fueling positions. It is important to note, that parked vehicles or other equipment must be positioned so as to not obstruct the EFSO.

As you conduct your ramp safety inspections, take special note of where ramp equipment and GSE are parked. Observe that the fuelers are following proper safety procedures and address any non-conformities immediately.

Adverse weather conditions

High Winds

Below is a list of general guidelines to follow when there are high winds:

- Secure aircraft with additional chocks, tie downs (especially on smaller aircraft), and if necessary, weighting down the aircraft with ballast.
- Secure any load inside the aircraft, close all aircraft doors and service panels.
- Hook up tow bar and attach tug. Make sure the steering by-pass pins are engaged.
- Move aircraft away from buildings and structures and face into wind.
- Remove all non-essential GSE from around aircraft. Ensure each dolly or baggage trailer is disconnected and held by its own individual brake.
- Remove all empty and loose ULD from around aircraft. Make sure they are secured as much as possible.
- Stop all refueling and aircraft servicing. Clear the ramp of vehicles and people.

„Autopilot”
Microburst

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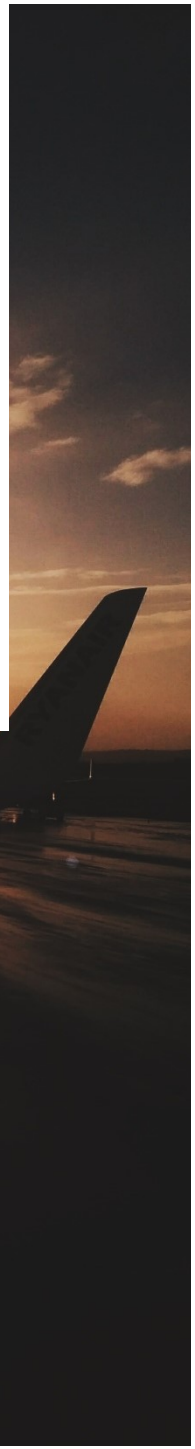
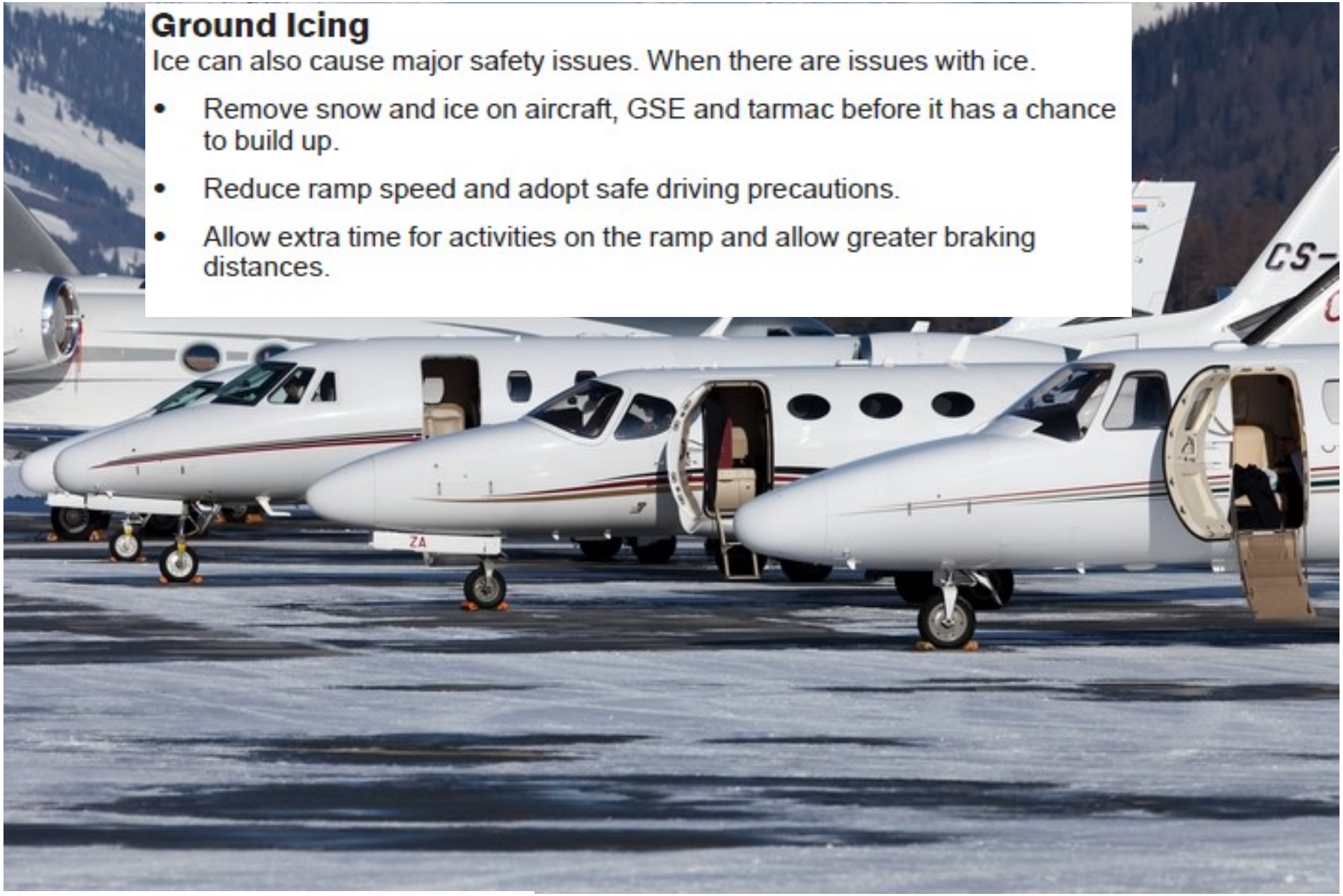
Low Visibility and Bright Sunlight

Variances in an employees ability to see occurs during times of low visibility and bright sunlight. During these times of the operation, extra precautions should be implemented to heighten the need for safety awareness. Safety precautions may include:

- reduction of ramp speed to that of a crawl during times of low visibility
- utilizing lights beacons and windshield wipers
- exercising caution when driving in bright sunshine, especially when emerging from under buildings and dark areas into the sun
- donning polarized sunglasses to assist with glare from reflective surfaces

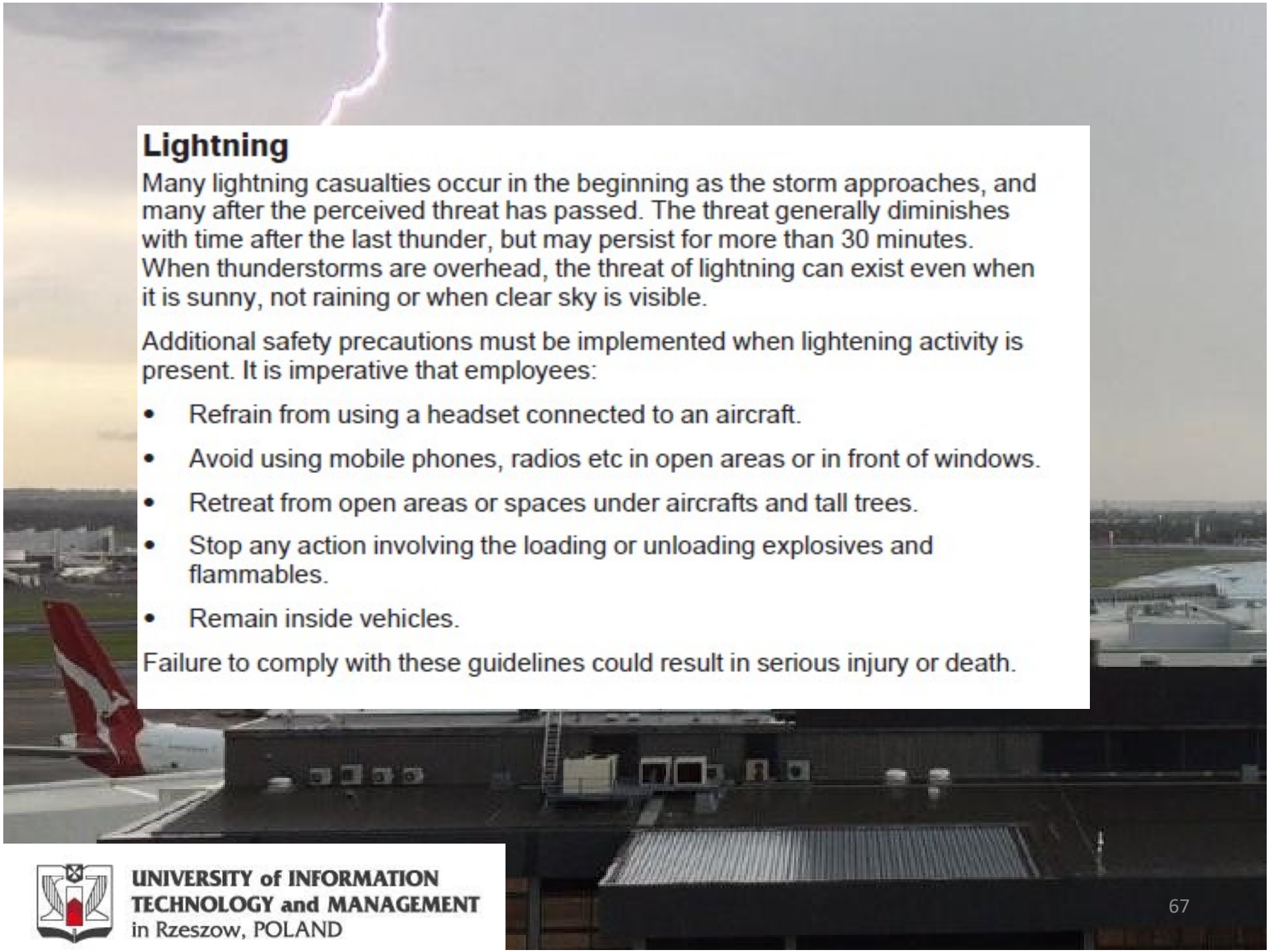




Ground Icing

Ice can also cause major safety issues. When there are issues with ice.

- Remove snow and ice on aircraft, GSE and tarmac before it has a chance to build up.
- Reduce ramp speed and adopt safe driving precautions.
- Allow extra time for activities on the ramp and allow greater braking distances.



Lightning

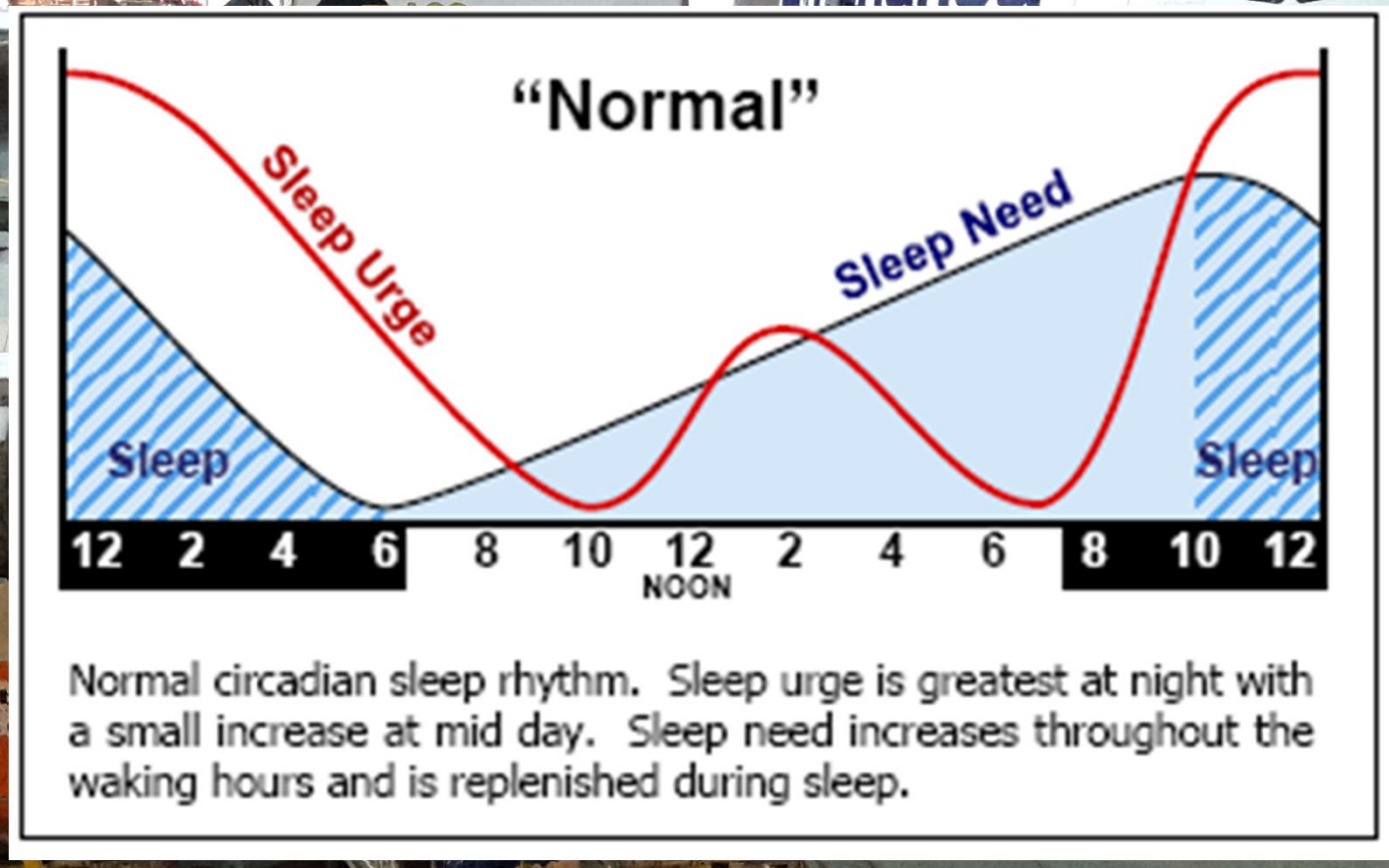
Many lightning casualties occur in the beginning as the storm approaches, and many after the perceived threat has passed. The threat generally diminishes with time after the last thunder, but may persist for more than 30 minutes. When thunderstorms are overhead, the threat of lightning can exist even when it is sunny, not raining or when clear sky is visible.

Additional safety precautions must be implemented when lightening activity is present. It is imperative that employees:

- Refrain from using a headset connected to an aircraft.
- Avoid using mobile phones, radios etc in open areas or in front of windows.
- Retreat from open areas or spaces under aircrafts and tall trees.
- Stop any action involving the loading or unloading explosives and flammables.
- Remain inside vehicles.

Failure to comply with these guidelines could result in serious injury or death.

Night operations

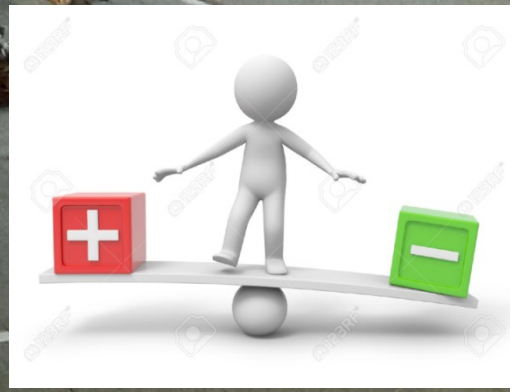


Normal circadian sleep rhythm. Sleep urge is greatest at night with a small increase at mid day. Sleep need increases throughout the waking hours and is replenished during sleep.

Night operations

Positive and Negative Points

Because of shift workers, the aviation industry is kept moving 24 hours a day. To the worker, shiftwork might mean extra pay or more free hours during the daytime. However, we already mentioned that shiftwork schedules are demanding and likely to produce stress and fatigue. In addition, shiftwork might affect safety, health, or ability to do the job. The negative impact of shiftwork can be felt almost immediately upon starting: problems in sleep, circadian rhythm instability, low performance, risks involving safety issues and interference with social and family life. Long-term effects include: aggravation of an existing problem, nausea, digestion problems and heart disease.



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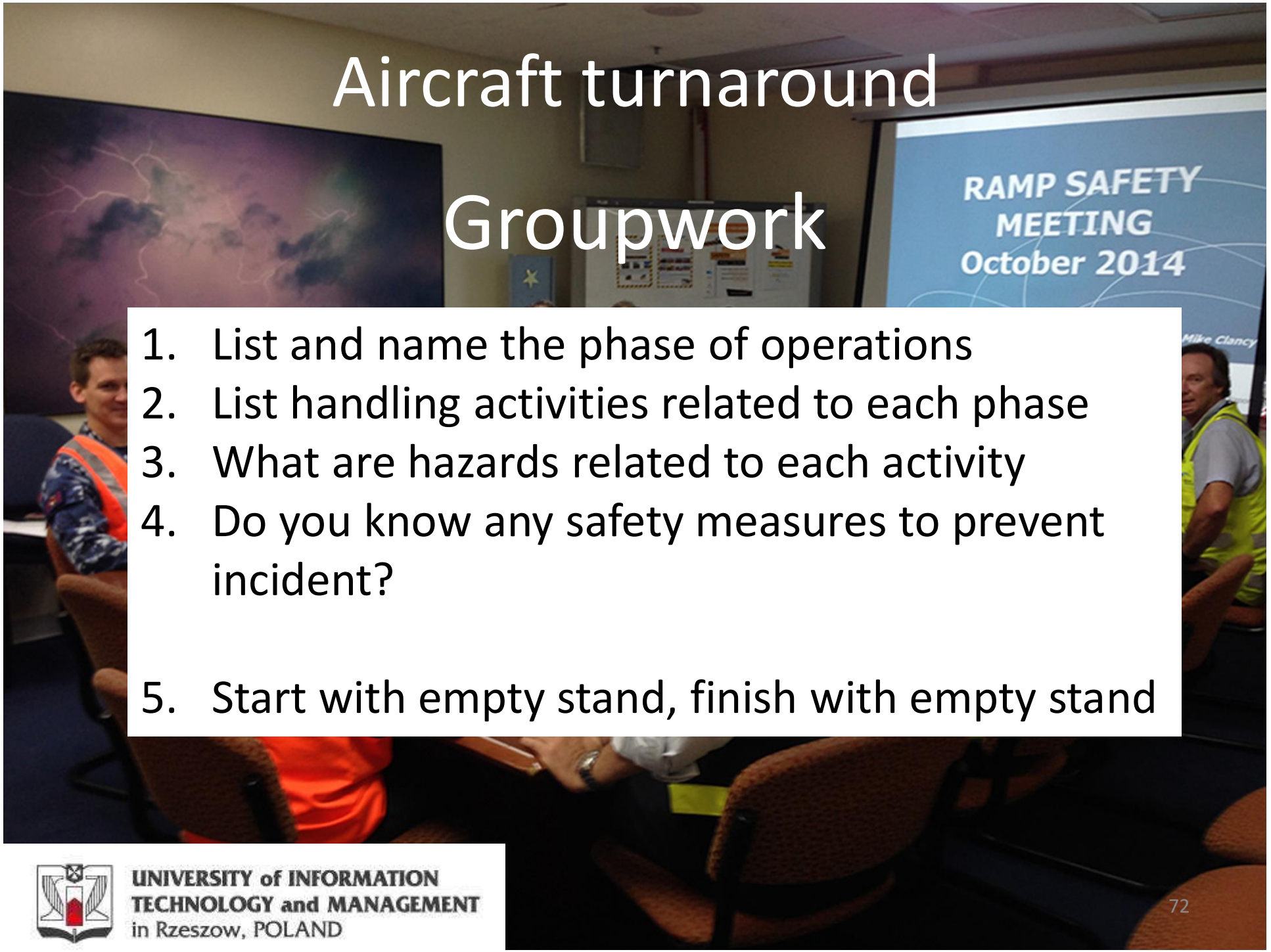
Working at height

Aircraft rotation

Aircraft turnaround

Groupwork



1. List and name the phase of operations
2. List handling activities related to each phase
3. What are hazards related to each activity
4. Do you know any safety measures to prevent incident?

5. Start with empty stand, finish with empty stand

Personal Protective Equipment (PPE) includes a high visibility vest, ear protection, safety shoes, gloves, sunglasses and knee protectors.

AIRCRAFT MARSHALLING SIGNALS

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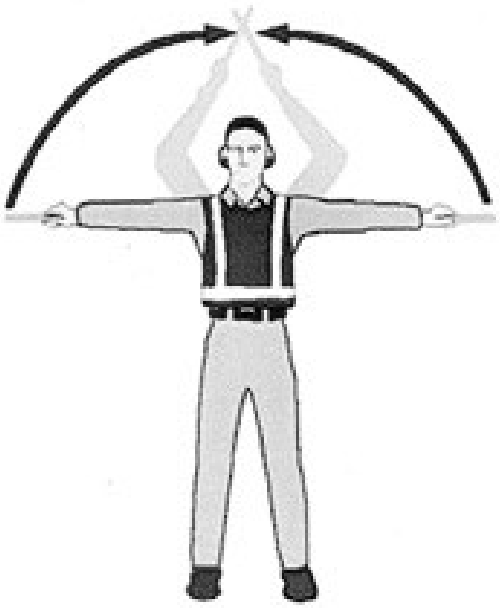
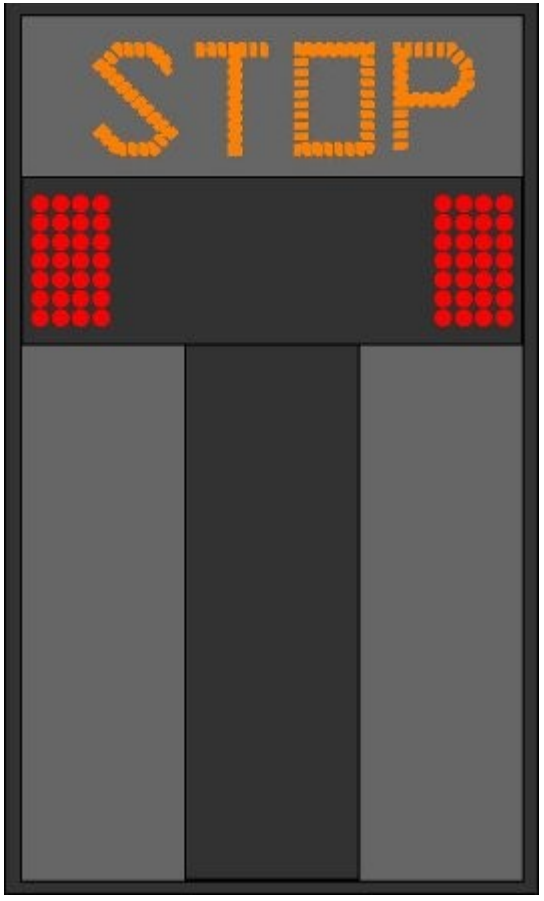
Ground to Flight Deck Emergency Hand Signals: How to tell an aircraft to stop? How to tell a pilot to apply or release aircraft brakes?



VDGS Emergency Stop

Where a Visual Docking Guidance System (VDGS) has been installed , there is normally an emergency stop button located nearby. This button should be manned as the aircraft enters the stand in case it is required to stop suddenly. Although systems vary, when the button is pressed it will display a "STOP" sign normally accompanied by some sort of red lighting.



Safety Precautions When Working Around Aircraft

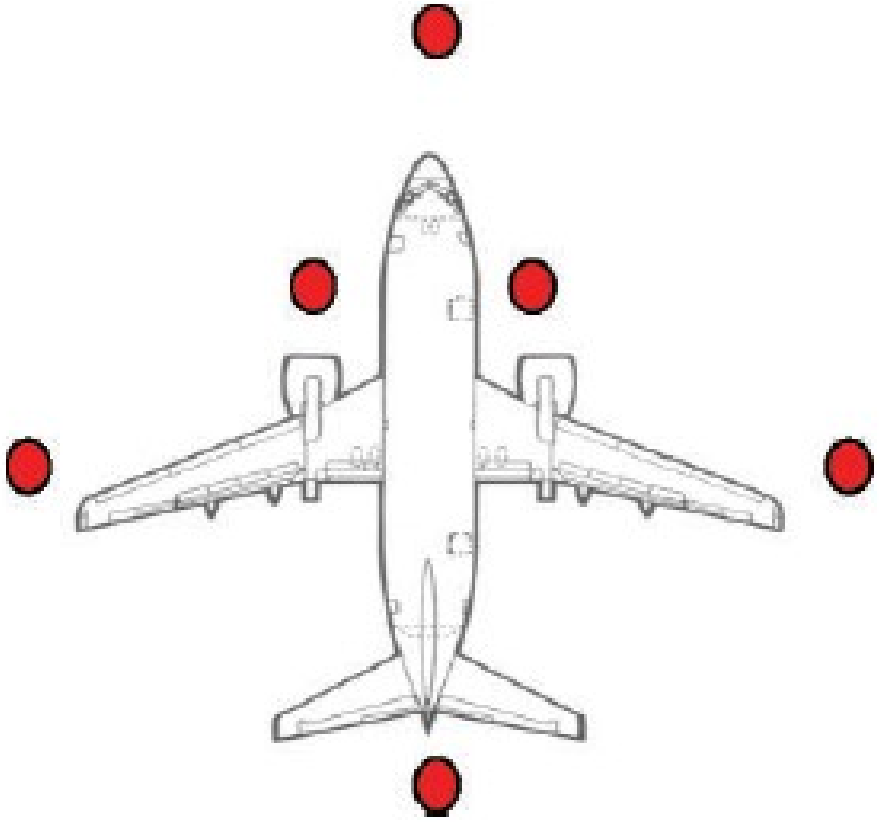
Special care needs to be taken when operating GSE and boarding bridges during the arrival of aircraft, procedures must be in place to ensure safety for all personnel during this operationally critical time. Again, the procedures in the IGOM, provide clear direction that no GSE or boarding bridges may be moved towards the aircraft until:

- the aircraft has come to a complete stop
- the aircraft engines have been switched off and are spooling down
- the anti-collision lights are switched off
- the wheels are chocked
- communication has been established between Ground/Flight Crew

Cargolux

Make sure the aircraft wheels are chocked before positioning GSE. (A ***chock*** is a portable piece of material, usually made of rubber or metal, that is placed in front of and behind the wheels of an aircraft when parked on the apron to prevent movement.)

Although this can vary from airline to airline, Safety Cones must be positioned around the aircraft one in front of the starboard (right in the direction of flight) wing tip and one, at the port (left) wing tip and one at the tail of the aircraft and in front of engines.



What risk is connected to opening aircraft doors from outside?

Opening aircraft doors from the outside represents a risk as the escape chute may still be armed.

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Loading problems

Unforseen events

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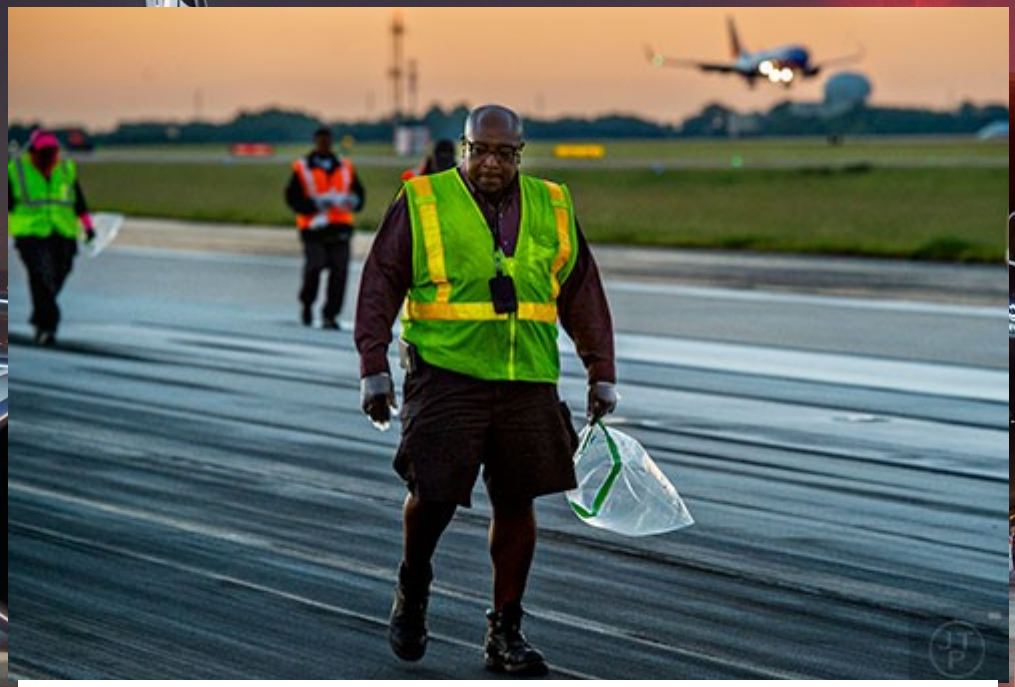
Too much haste?

Does push back mean the end of operations on the stand?



FODwalk – a good practice

Deicing

Questions?