EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

This Document is issued as an EATMP Guideline. The contents are not mandatory. They provide information and explanation or may indicate best practice.

Guidelines for Controller Training in the Handling of Unusual/Emergency Situations

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Abstract

Many present day controllers rarely experience an unusual/emergency situation. Short training periods of half a day are of benefit, and the use of case studies is suggested. Checklists can help to ensure a proper response. Regular pilot-controller briefings are very desirable.

Keywords

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CONTENTS

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EXECUTIVE SUMMARY

This deliverable and its associated annexes are produced as a result of a workshop on the handling of unusual incidents held at the EUROCONTROL Institute of Air Navigation Services (IANS), Luxembourg, in April 1996.

The presentations at the workshop were in many cases based on real incidents and it was possible to identify the individuals concerned. As this is a sensitive area, the actual workshop has not been reported on in a formal manner, but this document uses the presentations and their content to convey the need for continuation training for air traffic controllers in the area. Some examples of the type of incidents are used.

A 'checklist' is proposed for use in order to ensure proper handling of any incident which requires controller action. Suggestions for the content of such a checklist are included. The background material has been provided by Germany, Switzerland, The United Kingdom and The Netherlands. Additional input and advice was provided by aircrew personnel from Deutsche Lufthansa (DLH).

A simple set of acronyms has been provided which may make it easier for controllers to remember the immediate actions, or sequence of actions, to be followed on initial notification of any incident.

The guidelines include some comment on the fact that pilots in general are reluctant to use the phrases 'PAN PAN' or 'MAYDAY'. A major exercise in conveying the real benefits of the use of the Secondary Surveillance Radar (SSR) special codes to pilots should be embarked on as quickly as possible, using magazine articles, seminars and joint pilot-controller discussion groups.

This second edition of the deliverable is intended to reflect any operational changes that have come about since the first edition in 1999 and includes a new checklist on Airborne Collision Avoidance System (ACAS) / Traffic Alert and Collision-Avoidance System (TCAS) procedures.

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1. INTRODUCTION

1.1 Background

Many controllers in these days of improved equipment, both in the air and on the ground, go through lengthy periods without ever having to handle any traffic situation which presents anything out of the ordinary.

While this trend of increased safety for the flying public is most welcome, it does point out the need for the controller to be kept in practice in dealing with any situation which may arise so that when something unusual occurs safety is not impaired.

Within the European Air Traffic Management Programme (EATMP)[1] framework a Work Package, which became a Specialist Task (ST12) covering continuation training for air traffic controllers, was established at a very early stage. In that context this document was prepared to provide a brief insight into what is possible, and what is desirable.

Following the publication of this deliverable in June 1999 work has continued on the development of this training. It has now evolved to a Web-based training package allowing for self-tuition.

This new print edition has been rationalised with new and updated checklists including one for Airborne Collision Avoidance System (ACAS) / Traffic Alert and Collision-Avoidance System (TCAS).

This deliverable is complementary to the Web-based training (available at http://www.ians.lu).

Note: For the purposes of the checklist on Radio Communications Failure, the procedures in ICAO Doc 7030, Regional Supplementary Procedures (European Region), have been used.

1.2 Scope and Purpose

The original intention after the workshop was to produce a report which contained details of all of the presentations made. However, on examination it was felt that this might lead to publication of some data which could be regarded as very sensitive and possibly confidential.

Many points very pertinent to the future training practices in regard to the handling of such situations were made at the workshop. The workshop pointed

[1] Formerly known as the 'European Air Traffic Control Harmonisation and Integration Programme (EATCHIP).

out areas which need to be part of an advisory service for all air traffic controllers. The need to keep colleagues and the supervisor in the loop was very noticeable, as was the need to provide an appropriate level of service to the pilot. Frequency clutter should be reduced to a minimum, the pilot should be given time and space in which to make initial attempts to solve the problems.

As each incident, however routine, is nowadays investigated and analysed, an international trend became apparent which suggests that the following actions were both desirable and necessary:

- discussion groups to analyse the incident and the controllers reaction;
- support on the counselling front for the controller who has been in position during an accident or very serious incident;
- the creation of simulation exercises which include the pertinent parts of the accident/ incident scenarios;
- the use of role playing sessions.

The Training Development and Harmonisation (TDH) Unit at IANS, through the Training Sub-Group (TSG) of the EATMP Human Resources Team (HRT), decided to create an informal working group made up of personnel from Member States having some experience in the matter. To this initial group were added, on a voluntary basis, two airline pilots from a major European air carrier.

In discussion this group reached a broad consensus on a plan of action which could be presented to the European Civil Aviation Conference (ECAC) States as a guideline on how to deal with the problem, and a suggested course format for any training.

2. ORGANISATION OF THE TRAINING

Documentation made available by DLH and Deutsche Flugsicherung (DFS), Germany, The Netherlands and Switzerland was available for discussion and future use. This consisted in the main of checklists and, in the case of Germany, a description of the Joint Operational Incidents Training (JOINT) Programme currently in operation between DLH and DFS. Lengthy discussion took place on the use of checklists and there was broad consensus that, while a checklist has a specific connotation for pilots, it is not normally used as a term within the Air Traffic Control (ATC) world. It was nevertheless decided to advocate the use of a checklist by controllers in the future.

JOINT is a training mechanism in use between the DFS ATC Academy at Langen, Regional Air Navigation Unit at Frankfurt, and the DLH Training Centre in Frankfurt. The flight and ATC simulators can be linked so that what is being rehearsed by the pilot during Line-oriented Flight Training (LOFT) can impact upon the exercises being run in the ATC simulator. This makes for very realistic scenarios.

The use of flight simulators, however basic, in this phase of training can be beneficial. It can provide a controller with some insight into what actually goes wrong in a cockpit, and can let him see for himself how the problem may be presented on the aircraft's instruments.

The group noted that there were considerable misunderstandings concerning communication between pilots and controllers in unusual incidents. It was noted that the fact that the news media 'scan' the ATC frequencies placed some constraints on the pilot's use of the word MAYDAY or PAN PAN. Many controllers would appreciate policy on the handling of media enquiries in these circumstances.

It was further noted that many pilots had a misunderstanding of the ATC interpretation of a MAYDAY call, and do not fully appreciate that this call will ensure that the ATC unit concerned will immediately take certain actions on receipt of the call. The group agreed that there is an apparent need to expand on the use of the PAN PAN call.

The use of the SSR special codes was discussed, and it was clear that many pilots do not understand the benefits of using such codes. The fact that such codes activate in multiple sectors, and therefore draw the attention of multiple controllers and their supervisors, is apparently not clearly understood. Through such activation the sector controller is, to some extent, assured of advice and assistance from colleagues.

Checklists were discussed at some length and a number of alternative titles were suggested:

- EMERGENCY ACTION GUIDELINE,
- EMERGENCY COMMUNICATION GUIDELINE,
- EMERGENCY REFERENCE LIST,
- ABNORMAL AND EMERGENCY REFERENCE LIST,
- EMERGENCY CHECKLIST.

There was no universally acceptable title. The group did note that any checklist must be brief and to the point, and should not be cumbersome in size or operation. Ultimately, the titling of the proposed checklist is left to each individual State. The model at Annex A is not intended to be the only version.

3. ACRONYMS AND MNEMONICS

The group noted that all the States represented had some form of simple sets of rules to be adhered to by the controller. The use of abbreviations is common in the ATC world and it seems logical, therefore, to suggest a few relevant possibilities:

3.1 RISC

- **R**ecognise that there is a problem
- **I**dentify the relevant aircraft and arrange for special code Squawk
- **S**eparate - Give the pilots airspace in which to operate and give them time
- **C**ommunicate with adjacent sectors/colleagues/supervisors as appropriate

3.2 TAS

- **T**ime - Give the pilot time to sort out the immediate problem on receipt of first notification that there is a difficulty
- **A**irspace - Give the pilot freedom of the adjacent airspace - get other aircraft out of the way, and off the frequency
- **S**ilence - The controller should clear the frequency and not raise more questions than are necessary

3.3 SSSS

- **S**quawk - Acknowledge the call; make sure the correct squawk is produced
- **S**ilence - Keep the Radiotelephony (RTF) to as low a level as possible - where possible assign a single frequency to the incident
- **S**eparate - Provide appropriate and adequate airspace for the pilot to execute any essential manoeuvres
- **S**hout - Ask for assistance from the ATC supervisor and/or colleagues

3.4 QRST

- **Q**uiet - Keep the frequency clear
- **R**ecognise that there is a problem when the message is received
- **S**eparate - Provide airspace
- **T**ime - Give the pilot time to work on it

3.5 ATIS

- **A**nnouncing and acknowledging the emergency or problem, getting the pilot to make the appropriate squawk
- **T**aq - Giving the pilot time, airspace and quiet
- **I**nformation exchange pilot/controller and controller/controller
- **S**olving the problem as a team controller/controller and controller/pilot

3.6 ASSA

- **A**cknowledging the emergency or problem, getting the pilot to make the appropriate squawk
- **S**eparate the traffic and support the pilot in so far as is possible
- **S**ilence - Keep the RTF to a minimum; give the pilot time to think
- **A**dvise supervisor and appropriate colleagues on other sectors

3.7 ASSIST

- **A**cknowledge the call; get the squawk
- **S**eparate the aircraft from other traffic. Give it room to manoeuvre
- **S**ilence - on the frequency. Provide separate frequency where possible - this prevents unnecessary clutter for the pilots
- **I**nform those who need to know and those who can help; inform others as appropriate
- **S**upport the pilots in any way possible - Start to think of alternative routings, etc.
- **T**ime - Give the pilots time to collect their thoughts, don't harass them for information. Time produces good decisions

The group does not wish to force any or all of these acronyms on any Member State. Each is offered as a possibility though it should be noted that the DFS already has decided to use **ASSIST** and has produced some display items based on it. At Annex B to this document are EATCHIP/EATMP versions of some of the items above. Presentation number one has been found to be most acceptable among an in-house survey of students who have passed through the IANS during the early part of 1998.

No individual item is suggested above any of the others. It is left to each State to use any of the above or none as it sees fit.

4. CHECKLISTS

There was consensus that there should be two levels of checklist:

- the first list should cover the immediate, urgent and essential actions;
- the second list should cover the supplementary items, i.e. not necessarily essential to be complied with immediately but which should be used as the situation progresses.

The checklists should cover each of the different disciplines: Area, Approach and Aerodrome.

The main checklist should be available at the working position and more detailed memorandum, providing local or site specific data, could be added at the supervisor's position. The data should be available in hard copy though a supplementary copy could be available on any automated information system.

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5. TRAINING - GENERAL

It was noted that an educational process needed to be undertaken to ensure that both pilot and controller groups were aware of the many misunderstandings which obviously existed within each group as to the needs of the other. A number of suggestions were made to promulgate the topic, using relevant magazines, workshops and pilot-controller briefing sessions.

Suggestions were made that possible joint training sessions using airline simulators might also be of benefit both for the controller and the pilot. Each would have an opportunity of seeing how current practices in the handling of incidents impact on each other. It was acknowledged that the DFS/DLH JOINT Programme was a major step in the right direction.

The group noted that this opportunity should be taken to have the pilot, who is already well drilled in Crew Resource Management (CRM), and the controller, for whom Team Resource Management (TRM) is coming on stream work together as a TEAM. This will require close cooperation between ATC training units and the airline counterparts. Examples of such cooperation can be found in the links between DFS and DLH, and in the arrangements made in The Netherlands, The United Kingdom and EUROCONTROL to involve airline personnel and/or equipment in the exercises.

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6. TRAINING PROGRAMME FOR CONTROLLERS

The length of any training programme is dependent on the intended content, the frequency at which it is conducted, the number of participants and so on. This group had access to a variety of ATC training schedules. The group noted that, when this type of training is introduced for the first time, it is not always on a 'pass/fail' basis. When it becomes part of the competency checking mechanism it is then subject to the usual rules of assessment which may pertain in the individual State.

In the interest of expediting this particular type of training, or re-training, of controllers, it is suggested that in many cases simple programmes lasting only half of one day could be constructed and administered each year. The more complex training sessions would of course take a number of days to complete, but would be worthwhile at least in the first instance and subsequently in, possibly, alternate years. In either case it is important that the controller understands the benefits of clearing the airspace around the particular aircraft, providing silence on the frequency and getting support from colleagues.

For the shorter courses, the use of a single case study will highlight many of the necessary points, and of course if a simulation can be included so much the better. In an ideal world, a programme such as JOINT which is mentioned earlier would be ideal as it provides for input from both the pilots' and the controllers' viewpoint.

In any case it is strongly recommended that regular pilot-controller discussions are initiated so that both sides can discuss a problem as seen from both the cockpit and the ATC unit. Indeed, wherever possible, combined training sessions are recommended. Not only will it increase mutual understanding of the problems involved from both sides of the incident, but will also increase the comprehension of the problems and the possible solutions.

In all of the foregoing no mention has been made of stress. During the workshop a number of references were made to this very important topic. One presentation, that from the International Federation of Air Traffic Controllers' Associations (IFATCA), was entirely aimed at the handling of Critical Incident Stress Management (CISM). A video of this presentation was made available by IFATCA and this may be had, on request, from IANS. There is also an EATCHIP publication dealing with this matter (see EATCHIP, 1997). Most of the training programmes examined include at least a short module on stress management, but post incident support, particularly following loss of life is equally important.

A short example of a course content could be (broadly based on input from The Netherlands):

- a refresher on ICAO rules pertinent to the handling of unusual situations, both in the air and on the ground;

- a brief discussion between participating controllers and an airline pilot where pilot needs could be aired - use one of the above-mentioned acronyms to introduce the subject;

- a brief discussion between the participating controllers outlining their needs, problems; mention the 'flight' syndrome where a controller may psychologically refuse to acknowledge that an incident is actually happening; acknowledge that in a PAN PAN or MAYDAY situation the aircraft can not be expected to behave normally;

- an outline of responsibilities according to ICAO;

- a panel discussion on the content of the course;

- a case study which might include an input from some of the participants in the particular incident;

- a summary of the discussions with recommendations on what the controller should do;

- a simulator exercise to allow for some practice of an airborne incident;

- a simulator exercise to allow for practice on an aircraft or ATC system degradation.

The use of video during these exercises produced some interesting feedback, and should be used only as a teaching/learning aid. The group noted that training for the trainers is a pre-requisite before embarking on this training programme. A motto for this type of training could very well be 'learning by incident is better than by accident'.

If possible, and deemed suitable, some controller interface within airline cockpit training could be an advantage. The Netherlands use this formula and each controller could expect to be put through the cockpit elements approximately once in three years.

The benefits are that a controller could be allowed to:

- gain an experience of the impact in the cockpit, during an emergency, of ATC input;

- note how ATC could disrupt cockpit procedures;

- note the benefits if ATC provides clear airspace for aircraft experiencing problems;

- participate in the exercise by using the RTF;

- go through the cockpit checklist for the incident;

- perform some of the simpler cockpit tasks on pilot instruction (gear, flaps, lights, etc.);

- contribute to the decisions;

- observe the details of a go-around.

The group was provided with some data by IANS which emanated from their early courses for ATC supervisors, and from the introductory module on TRM. In each case, a prototype of a checklist (that of DFS) was placed before the participants for comment. In all cases there was demonstrable enthusiasm for the product.

In such circumstances the group has no hesitation in recommending the use of a checklist of which an example is attached as a technical annex (see Annex B, 'Checklist Booklet'), or one similar to it.

These TRM courses noted that a checklist would help the supervisor as much as the controller handling the incident as it could provide input on how to work for a common goal, and to better coordinate the operation. An observer/ assistant working with the controller who uses the checklist will be in a position to provide better quality support as it will be clear what the controller is doing, and the sequence in which it is being done.

The proposed checklist could contain sections on:

- ALL AVIATION,
- MILITARY AVIATION,
- GENERAL AVIATION – VFR,
- ATC SPECIFIC - LOCAL PROCEDURES.

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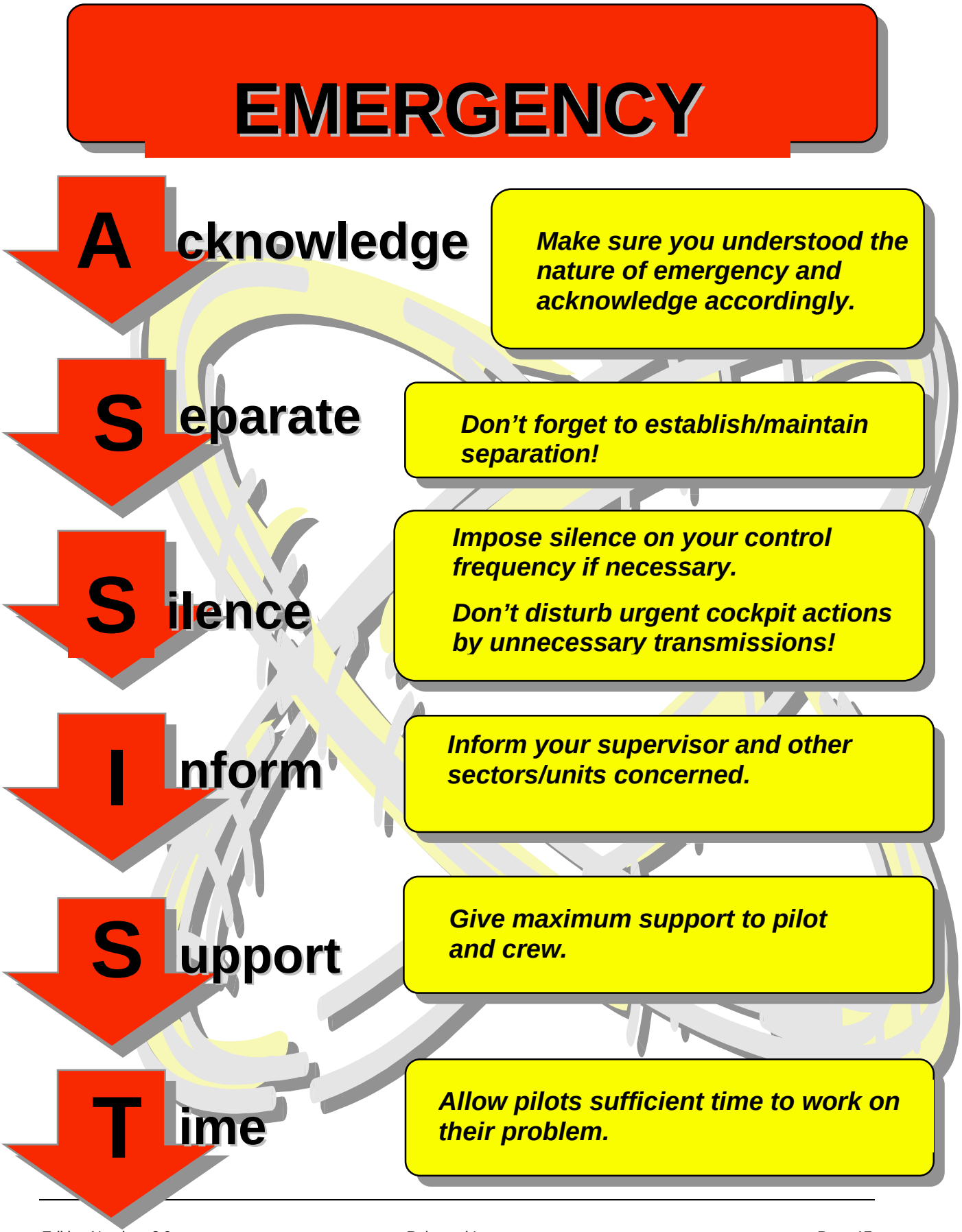
ANNEX A. POSTER



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ANNEX B. CHECKLIST BOOKLET

CHECKLISTS

For 16 scenarios

These lists are by no means exhaustive. Member States will obviously use local expertise to compile additional items.

ACAS / TCAS

> Expect

- Climb or descent without prior warning
- No emergency squawk
- Two or more aircraft involved
- Notification from pilot of 'TCAS climb' or 'TCAS descent'

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

When a pilot reports a manoeuvre induced by an RA:

- the controller shall not attempt to modify the aircraft flight path
- the controller shall provide traffic information as appropriate
- pilots very busy
- TCAS II altitude data is more accurate than radar data

NB: Once an aircraft departs from its clearance in compliance with a RA, the controller ceases to be responsible for providing separation between that aircraft and any other aircraft affected as a direct consequence of the manoeuvre induced by the RA.

- The controller shall resume responsibility for providing separation for all the affected aircraft when:

  1. The controller acknowledges a report from the flight crew that the aircraft has resumed the current clearance

     OR

  2. The controller acknowledges a report from the flight crew that the aircraft is resuming the current clearance and issues an alternative clearance which is acknowledged by the flight crew.

- Following an RA event, or other significant ACAS event, pilots and controllers should complete an air traffic incident report

Birdstrike

May result in:

- Broken Windshield / Canopy
- Engine Failure (multi-engine)
- Engine Failure (single engine)
- Hydraulic Problems
- Precautionary Approach
- Handling Difficulties
- Electrical Problems
- Gear Problems

> Expect

- Abandoned take-off
- Immediate return to aerodrome
- Landing next suitable aerodrome
- Restricted visibility
- Hydraulic problems

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Is pilot able to control ACFT?
- Allow long final if requested
- Check RWY (if birdstrike after take-off)

> If needed, inform pilot about:

- Aerodrome details as soon as possible

Bomb Warning

> Expect

- ACFT may stop climb
- Request for immediate level re-clearance
- Landing next suitable aerodrome
- ACFT early in landing configuration
- RWY in use, length, surface, elevation, ILS- and NAV-frequencies

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Clear airspace in the immediate vicinity
- Ask for flying time needed
- Evacuation after landing
- Additional stairs required
- Clear RWY according to local instructions
- Keep safety strip clear
- Arrange parking away from buildings/other aircraft

> If needed, inform pilot about:

- Aerodrome details as soon as possible

Brake Problems

> Expect

- Pilots request longest RWY
- Overrunning RWY threshold at far end
- Burst tyre
- ACFT may swerve off RWY
- RWY blocked after landing

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Inform pilot about RWY length / condition
- Keep safety strip clear
- Towing equipment on stand-by as appropriate
- Technical staff required

Communication Failure

Radio Communication Failure (ICAO Doc 7030 – Eur Region)

> Expect

VMC

- Squawk 7600
- Continue in VMC
- Land at nearest suitable aerodrome
- Report arrival by the most expeditious means to the appropriate ATS unit

IMC

- Squawk 7600
- Maintain last assigned speed and level for 7 mins OR minimum flight altitude, if the minimum flight altitude is higher than the last assigned level
  The 7-minute period commences:
  No compulsory reporting points OR position reports omitted:
  - at the time the last assigned level or minimum flight altitude is reached, OR at the time of squawk 7600, whichever is LATER, OR

  Compulsory reporting points AND position reports not omitted:
  - at the time the last assigned level or minimum flight altitude is reached, OR at the previously reported pilot estimate for the compulsory reporting point, OR at the time of a failed report over a compulsory reporting point, whichever is LATER

  Thereafter, comply with the filed flight plan
- If being radar vectored, or proceeding offset according to RNAV without a specified limit, proceed in the most direct manner possible to rejoin the CPL no later than the next significant point, taking into consideration the applicable min. flight altitude
- The ACFT will proceed to the designated navigational aid serving the destination aerodrome and hold until commencement of descent
- Commence descent at, or as close as possible to, the EAT last received and acknowledged, OR if no EAT received and acknowledged, commence descent at, or as close as possible to, the ETA resulting from the CPL
- Complete a normal instrument approach procedure as specified for the designated navigation aid
- Land, if possible, within 30 minutes after the ETA specified, OR within 30 minutes of the last acknowledged expected approach time, whichever is later

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Failure of transmitter or receiver only
- Possible relay by other stations?

Electrical Problems

Loss of all generators (alternators) / battery power only
power supply reduced to emergency level

> Expect

- High stress level in the cockpit
- NAV – failure, including compass
- Transponder switched off (save energy)
- Communication failure
- Limited readbacks
- Level changes to maintain VMC
- Manual gear extension
- Possible engine failure

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Inform landing aerodrome

> If needed, inform pilot about:

- Next suitable aerodrome
- Aerodrome details as soon as possible
- Suitable vectors and position information
- Save energy
- Avoid IMC

Emergency Descent

> Expect

- Descent without warning
- No emergency squawk
- Poor or no RTF (oxygen mask)

When an aircraft operated as a controlled flight experiences sudden decompression or a (similar) malfunction requiring an emergency descent, the aircraft shall, if able:

- Initiate a turn away from the assigned route or track before commencing the emergency descent
- Advise the appropriate air traffic control unit as soon as possible of the emergency descent
- Set transponder to Code 7700 and select the Emergency Mode on ADS/CPDLC system, if applicable
- Turn on aircraft exterior lights
- Watch for conflicting traffic both visually and by reference to ACAS (if equipped)
- Coordinate its further intentions with the appropriate ACT unit

The aircraft shall not descend below the lowest published minimum altitude which will provide a minimum vertical clearance of 300m (1000 ft) or in designated mountainous terrain 600m (2000 ft) above all obstacles located in the area specified.

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Acknowledge emergency on RTF
- Take all necessary action to safeguard all aircraft concerned
- May be required to suggest a heading
- May be required to state the minimum altitude
- Provide separation or issue essential traffic information, as appropriate
- Emergency broadcast if necessary
- After emergency descent, request intentions:
  - Diversion
  - Injuries
  - ACFT damage
- Consider ACFT still to be in an emergency situation

Engine Failure

May result in:

- Abandoned Take-off
- Pressurisation Problems
- Fuel Dumping
- Precautionary Approach

> Expect

- Heavy workload in the cockpit
- Deviation from SID
- Intermediate level-off
- Descent
- Course deviation
- Pressurisation problems

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Inform landing aerodrome
- Clear RWY according to local instructions
- Keep safety strip clear
- Offer pilot extended final
- Towing equipment on stand-by as appropriate
- In case of forced landing, record last known position and time

> If needed, inform pilot about:

- Next suitable aerodrome
- Alternate aerodrome details as soon as possible
- WX information of landing aerodrome

Engine on Fire or APU on Fire

May result in:

- Abandoned Take-off
- Engine Failure (multi-engine)
- Engine Failure (single engine)
- Smoke or Fire in the Cockpit
- Emergency Landing

> Expect

- Heavy workload in cockpit
- Engine shutdown / fire extinguishing

ACFT on the Ground

- Hot brakes
- Passenger evacuation
- RWY blocked

ACFT in the Air

- Pressurisation problems
- ACFT losing altitude
- Landing next suitable aerodrome
- Possible diversionary or forced landing (single engine ACFT)

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Ask if dangerous goods on board
- Ask for number of Persons On Board (POB)
- Inform landing aerodrome
- Clear RWY according to local instructions
- Keep safety strip clear
- In case of diversionary or forced landing, record last known position and time

> If needed, inform pilot about:

- Next suitable aerodrome
- Aerodrome details as soon as possible
- WX information of landing aerodrome
- Observed fire and/or smoke

Fuel Problems – Critical Fuel Status

May result in:

- Engine Failure (multi-engine)
- Engine Failure (single engine)
- Diversionary or Forced Landing

> Expect

- MAYDAY low on fuel emergency with imminent danger to ACFT
- PAN PAN minimum fuel ACFT needs priority handling
- Improper use of phraseology, verify actual fuel status (low on ..., minimum ... or minimum diversion fuel)

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Keep ACFT high (save fuel)
- Avoid ATC-caused GO AROUND
- Inform landing aerodrome
- Ask if dangerous goods on board
- Ask for number of Persons On Board (POB)
- Clear RWY according to local instructions
- Keep safety strip clear
- Towing equipment on standby as appropriate

> If needed, inform pilot about:

- Next suitable aerodrome
- Aerodrome details as soon as possible
- WX information at landing aerodrome

Gear Problems

Unsafe Indication / No Gear

May result in:

- Need for External Advice (engineering)

> Expect

- GO AROUND
- Low pass of tower for gear inspection by specialist engineering personnel
- Manual gear extension

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Prepare for LOW PASS for visual inspection
- Weight reduction necessary
- Clear RWY according to local instructions
- Keep safety strip clear
- Towing equipment on stand-by as appropriate

> If needed, inform pilot about:

- ACFT configuration (having consulted with company if appropriate)

Hydraulic Problems

Complete or partial failure of flight controls,
gear extension, brakes, flaps, nose wheel steering

May result in:

- Fuel Dumping
- Gear Problems
- Brake Problems
- Relatively High Speed
- Approach and Landing

> Expect

- Limited manoeuvrability
- Limited flap setting
- Limited bank angle
- Manual gear extension, no retraction possible
- Holding pattern for necessary checks
- Extended final
- Higher approach speed on final (up to 220 Kt IAS on flapless approach)
- Limited breaking capability
- Possible overrun
- RWY blocked on landing

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Increase vertical and lateral separation
- Ask if dangerous goods on board
- Ask for number of Persons On Board (POB)
- Avoid ATC-caused GO AROUND
- Clear RWY according to local instructions
- Keep safety strip clear
- Towing equipment on stand-by as appropriate

> If needed, inform pilot about:

- Next suitable aerodrome
- Aerodrome details as soon as possible
- WX information of landing aerodrome
- Fire or smoke from brakes

Icing

> Expect

- Immediate change of level and/or heading
- Limitation in rate of climb/descent
- Higher speed

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Avoid holding
- Enable continuous climb after departure
- Keep safety strip clear
- AIREP to other ACFT, other units and MET

> If needed, inform pilot about:

- Check anti-icing and de-icing systems
- Pitot heating
- Stall warner heating
- Carburettor heating
- Propeller heating / de-icing
- Wing anti-ice / de-ice
- Alternate air supply
- Windshield heating
- Descent with higher power setting to increase bleed air supply
- Higher approach/landing speed due to increase of stalling speed

Pressurisation Problems

May result in:

- Emergency Descent

> Expect

- ACFT will stop climb
- Request for immediate descent
- Emergency descent without warning
- No emergency squawk
- Possible turn off track
- Poor RTF (because of oxygen mask)
- Injuries to passengers or crew

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Clear airspace directly beneath the aircraft

Smoke or Fire in the Cockpit

Smoke or fire in the Cabin

> Expect

- High stress level in the cockpit
- Shortest high-speed vector to land - nearest suitable aerodrome
- Poor RTF (oxygen mask) or loss of RTF
- Passenger evacuation
- RWY blocked

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Ask if dangerous goods on board
- Ask for number of Persons On Board (POB)
- Inform landing aerodrome
- Offer out of wind landing if more expeditious
- Clear RWY according to local instructions
- Keep safety strip clear
- APP / RWY lighting system 100%

> If needed, inform pilot about:

- Track miles to touchdown of next suitable aerodrome
- Availability of automatic approach low visibility procedure
- Aerodrome details as soon as possible
- WX information of landing aerodrome

Unlawful Interference

> Expect

- Squawk 7500
- Course / level deviations
- No or unusual replies to RTF communication
- No compliance with given instructions

> Remember

A 'Acknowledge' - **S** 'Separate' - **S** 'Silence' - **I** 'Inform' - **S** 'Support - **T** 'Time'

- Do not initiate any further RTF referring to the hijacking unless confirmed by the pilot
- Comply with pilot's requests as far as possible
- Transmit pertinent information without expecting a reply
- Monitor all flight manoeuvres - give room for manoeuvre
- Collect any necessary information e.g. destination aerodrome, WX situation at destination, routing, etc.

> If needed, inform pilot about:

- Confirm squawk
- No reply here shall NOT be taken as an indication that the squawk was set by mistake
- Any information requested

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REFERENCES

EATCHIP Human Resources Team (1997). *Human Factors Module: Critical Incident Stress Management.* HUM.ET1.ST13.3000-REP-01. Ed. 1.0. Released Issue. Brussels: EUROCONTROL.

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ABBREVIATIONS AND ACRONYMS

For the purposes of this document the following abbreviations and acronyms shall apply:

ACAS	Airborne Collision Avoidance System
ACFT	Aircraft
ADS	Automatic Dependent Surveillance
AIREP	Air Report
APP	Approach Control (Service)
APU	Auxiliary Power Unit
ATC	Air Traffic Control
CAA	Civil Aviation Authority *(UK)*
CISM	Critical Incident Stress Management
CPDLC	Controller-to-Pilot Datalink Communication
CPL	Current Flight Plan
CRM	Crew Resource Management
DFS	Deutsche Flugsicherung *(Germany)*
DLH	Deutsche Lufthansa *(Germany)*
EAT	Expected Approach Time
EATCHIP	European Air Traffic Control Harmonisation and Implementation Programme *(now EATM(P))*
EATM(P)	European Air Traffic Management (Programme) *(formerly EATCHIP)*
ECAC	European Civil Aviation Conference
ET	Executive Task *(EATCHIP/EATMP)*
ETA	Estimated Time of Arrival
GUI	Guidelines *(EATCHIP/EATM(P))*
HRS	Human Resources Programme *(EATM(P))*

HRT	Human Resources Team *(EATCHIP/EATM(P))*
HUM	Human Resources (Domain) *(EATCHIP/EATMP)*
IANS	Institute of Air Navigation Services *(EUROCONTROL, Luxembourg)*
IAS	Indicated Air Speed
ICAO	International Civil Aviation Organization
IFATCA	International Federation of Air Traffic Controllers' Associations
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
JOINT	Joint Operational Incidents Training *(DFS/DLH)*
LOFT	Line-Oriented Flight Training
LVNL	Luchtverkeersleiding Nederland *(ATC The Netherlands)*
MET	Meteorology
NATS	National Air Traffic Services *(CAA, UK)*
NAV	Navigation
POB	Persons On Board
REP	Report *(EATCHIP/EATM(P))*
RNAV	Area Navigation
RTF	Radiotelephony
RWY	Runway
SD	Senior Director, EATM Service Business Unit *(EUROCONTROL Headquarters; formerly know as 'SDE')*
SDE	Senior Director, Principal EATMP Directorate *or, in short,* Senior Director EATMP *(EUROCONTROL Headquarters; now known as 'SD')*
SID	Standard Instrument Departure

SSR	Secondary Surveillance Radar
ST	Specialist Task *(EATCHIP/EATMP)*
TCAS	Traffic Alert and Collision-Avoidance System
TDH Unit	Training Development and Harmonisation Unit *(EUROCONTROL IANS*
TFG	Training Focus Group *(EATM, HRT; formerly known as 'TSG')*
TRM	Team Resource Management
TSG	Training Sub-Group *(EATCHIP/EATMP, HRT; now known as 'TFG')*
TSP	Training Sub-Programme *(EATMP, HRS)*
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
WX	Weather

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