

# ESPN-R Safety Promotion Workshop

EUROPEAN ROTORS  
Nov 8 – 10, 2022

## Inadvertent IMC (IIMC)

Report on an IIMC event at night during a police mission flight

Speaker:  
Company:

Stefan Bustert  
Police Flying Squadron  
State of Hesse, Germany

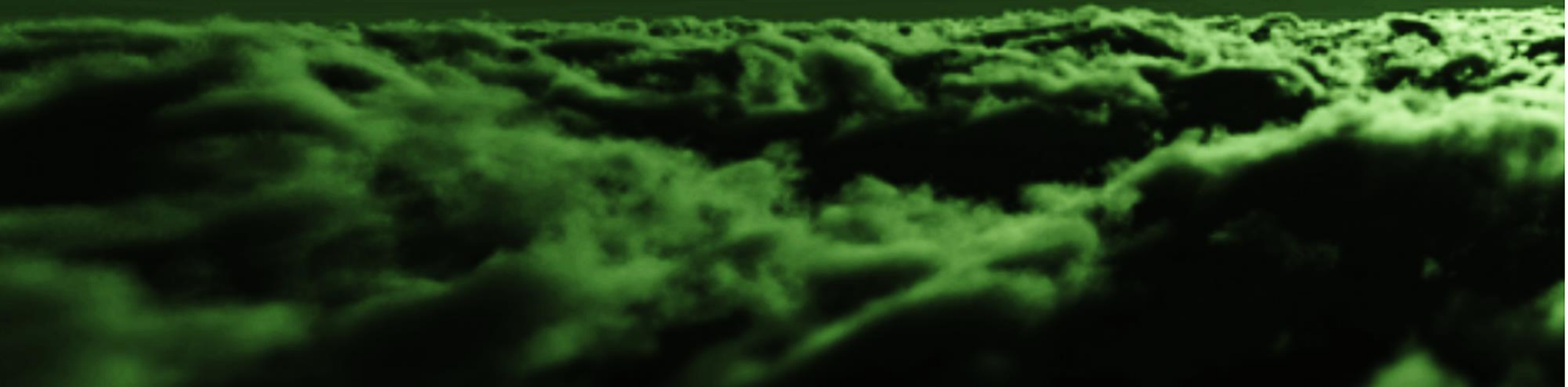




nachgestellt

# SITUATION

over a closed cloud layer and no more  
chance for a precautionary landing  
under VMC

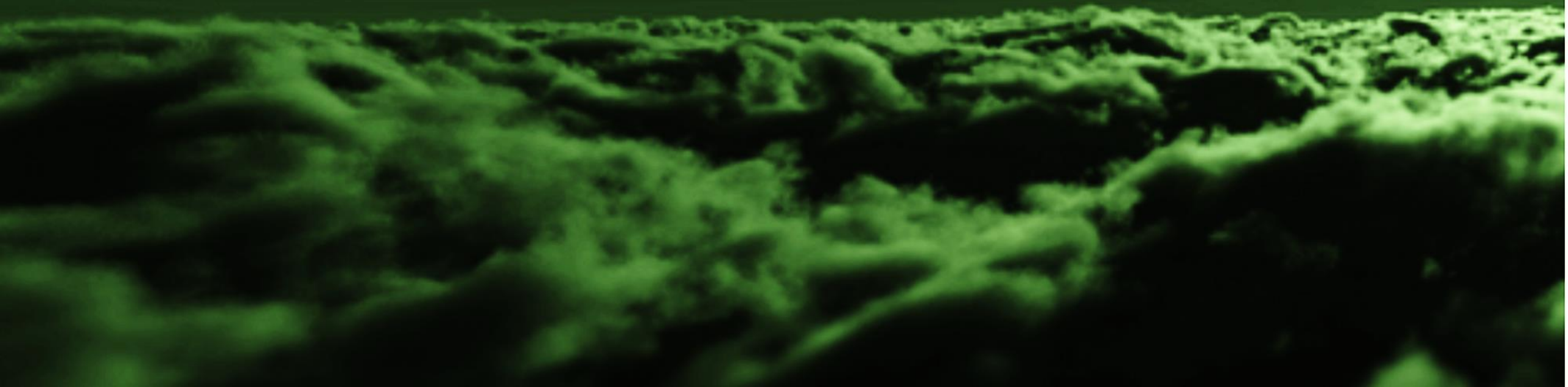




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Crew:

under time pressure, confused, tunnel  
vision, inexperienced, alone, loss of  
situational awareness

Pilot without IR and unable to  
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# WHAT NOW?

## How to prevent a disaster?

### SITUATION

over a closed cloud layer  
and no more chance for a  
precautionary landing  
under VMC

Pilot without IR and unable to make the  
setting for an ILS at the next airport

Crew:  
under time pressure, confused,  
tunnel vision, inexperienced, alone,  
loss of situational awareness

90 liters fuel remaining  
in the main tank



what we  
believed



Investigation



Measures /  
Actions



Lesson  
Learned





what we  
believed

# We believed...

...that we had a good training  
program for our crews!



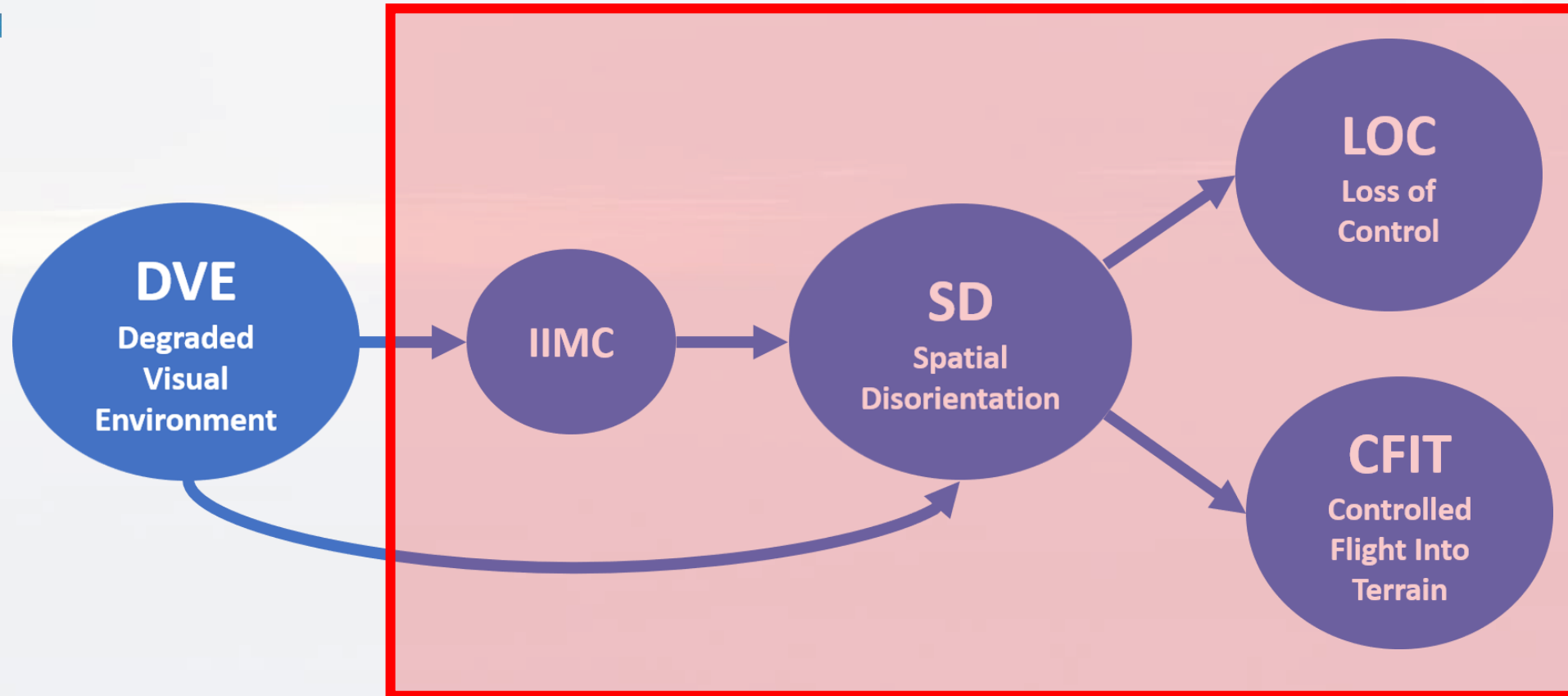
...that we had good Operation  
Manuals & Procedures





what we  
believed

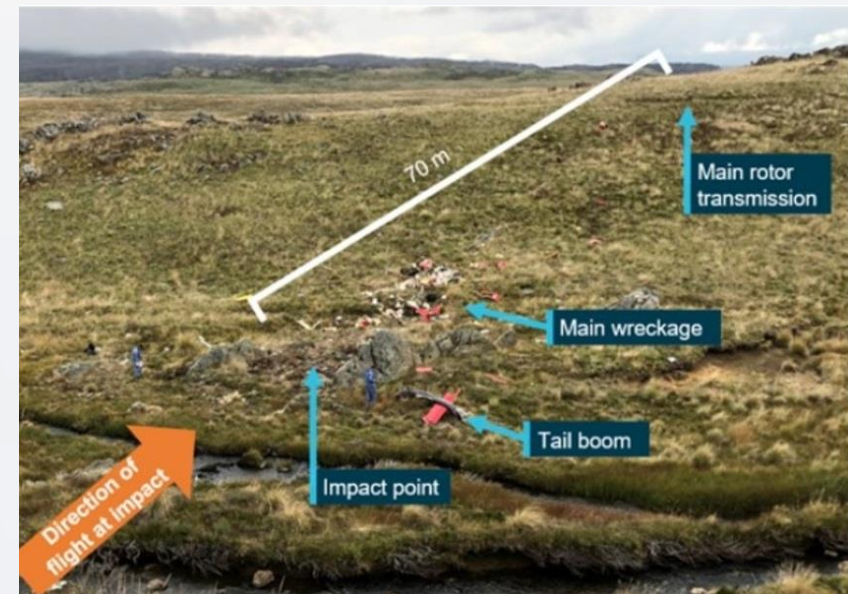
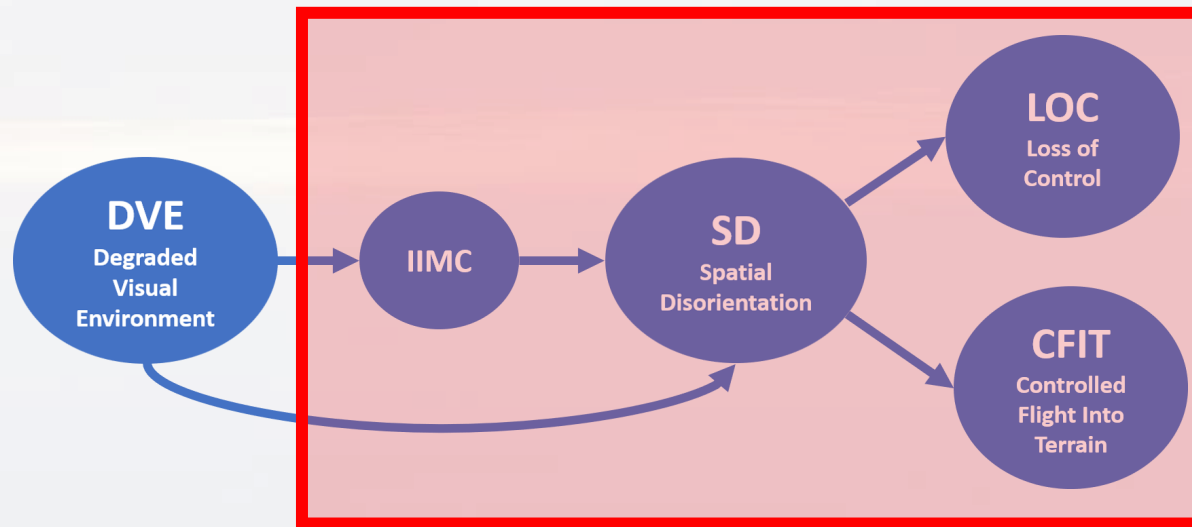
# ...to avoid:





what we  
believed

# ...to avoid:







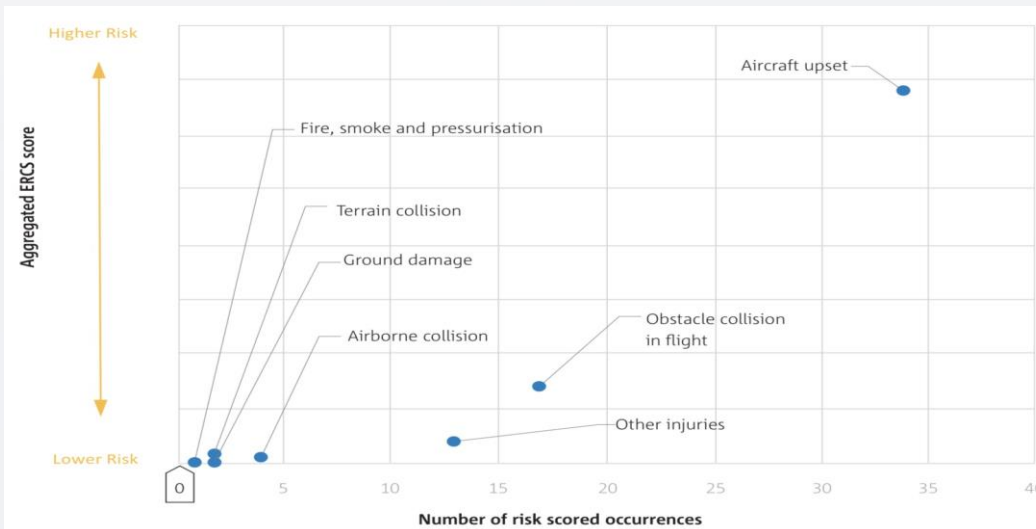
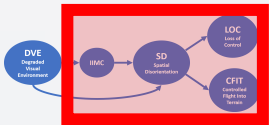
what we  
believed

...still the `top-killers` in our business

### Key Risk Areas in Rotorcraft Operations



Statistic  
2009 - 2019





what we  
believed

...still the `top-killers` in our business

26.01.2020, Sikorsky S76B, N72EX, „Kobe Bryant“, 9 Fatalis

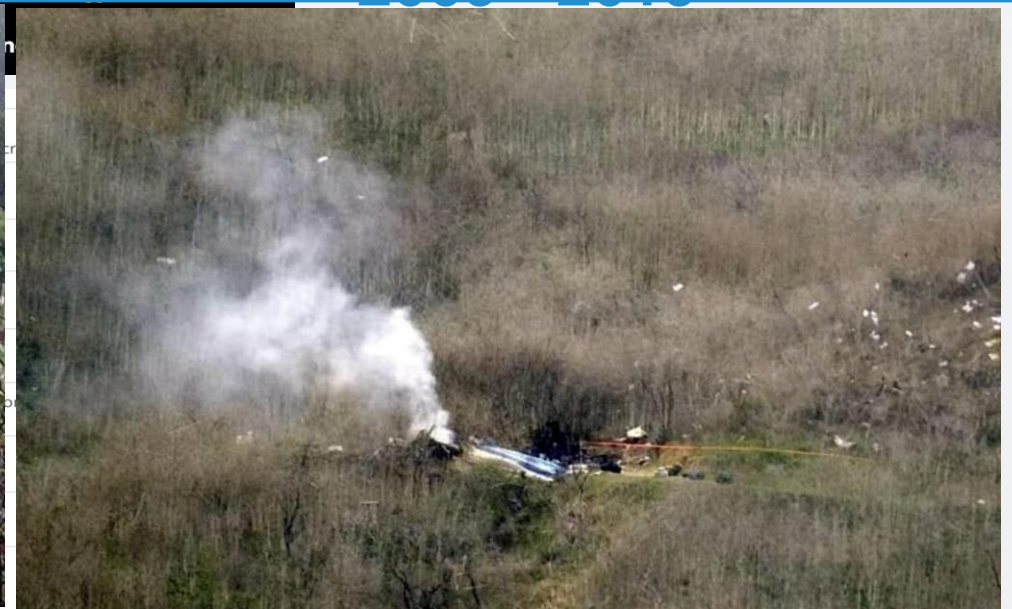
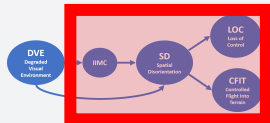
01.12.2019, EC145, F-ZBPZ, Sécurité Civile (Dragon 30), Rescue Mission, 3 Fatalis

29.01.2019, Bell 407, N191SF, Survival Flight, Rescue Mission, 3 Fatalis

11.12.2018, Sikorsky S76B, D-HHNN, „inadv. controlled flight towards terrain (CFIT(W))“, BFU 17-114441-7X

13.05.2018, AW139, VH-YHF, HEMS, Fa. Careflight, IIMC&Vortex, ATSB AO-2018-039

24.01.2017, AW139, EC-KJT, Rescue Mission, 6 Fatalis





what we  
believed

# We believed...

## ...in case of IIMC / UIMC

### VFR Pilot / Crew

DAY/NIGHT-ops

#### 180° turn

- Vy +/- 10 KIAS
- recheck terrain & obstacles
- AP Upper-Modes HDG /ALT engaged

### Pilot / Crew with IR

DAY/NIGHT-ops

#### 180° turn

- Vy +/- 10 KIAS
- recheck terrain & obstacles
- AP Upper-Modes HDG /ALT engaged

or

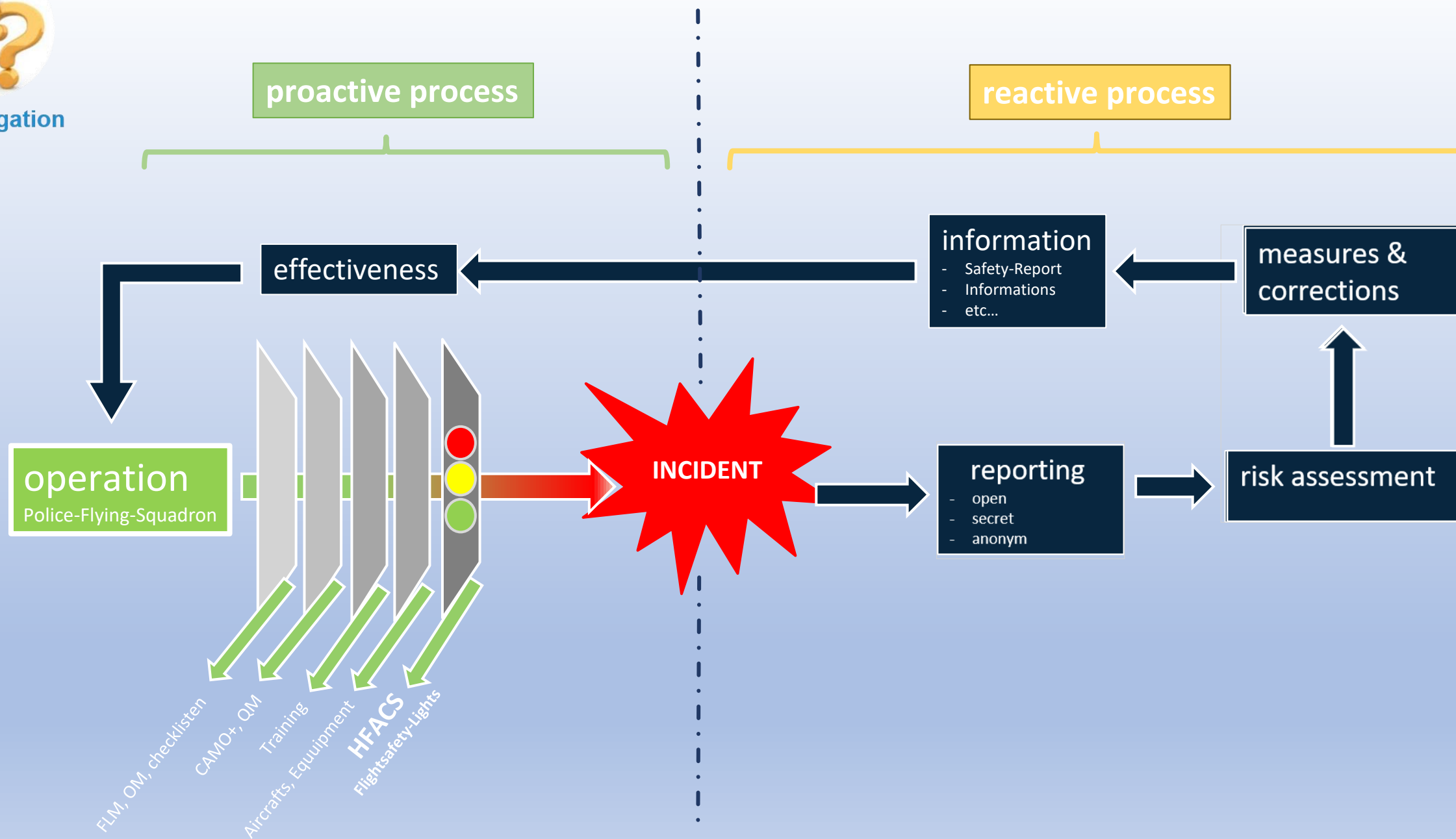
#### CLIMB to MSA

- Vy +/-10 KIAS & >1000ft/min
- recheck terrain & obstacles
- AP Upper-Modes HDG /ALT engaged
- XPDR set 7700 & contact ATC
- OAT recheck due to possible icing conditions
- proceed IFR to next airport with Instrument-APCH





## Investigation





## Investigation

➤ On May 25, the affected crew wrote an incident-report.



SMS AUSWERTUNG						
lfd. Nr.	LFZ - Kennz.	TT	TT Manuell	Datum der Meldung:	Vorgang abgeschlossen:	
210	D-HHEA	8336:23	0	25.05.2019	14.06.2020	
LFZ - Muster		Schadensart	Sachbearbeiter		Status	
EC145		Vorkommnis FD	SMS <input checked="" type="checkbox"/> QM <input type="checkbox"/>		Abgeschlossen	
Kurzbezeichnung: IIMC						
Beschreibung des Vorfalls: Gegen 3 Uhr nachts (loc) startete die Besatzung zu einem Einsatz nach Wittlich (nordöstl. Trier). Bereits auf dem Hinflug musste sich der Weg in (sehr gut laufender) Teamarbeit erfolgen werden, da die Untergrenzen den Direktweg nicht zuließen. Während des Einsatzes bei Wittlich klarte der Himmel zunehmend auf. Nach Abschluss des Einsatzes hatte sich entlang des Hunsrücks jedoch wieder massiver Nebel ausgebildet. Der Rückweg wurde ähnlich wie der Hinweg erarbeitet, die Bedingungen waren jedoch bereits schlechter geworden. Die Fluggeschwindigkeit betrug meist ca. 65 - 70 kt. Östlich Bernkastel-Kues leitete ich in 1900 ft AMSL noch in Sichtbedingungen eine Umkehrkurve nach rechts ein, da in dieser Richtung die Sicht besser war. Der PHS wurde durch die Upper-Modes ALT und HDG geflogen. Der RADALT zeigte ca. 500 ft GND. Trotz der Kurve kam es zum Sichtverlust. Der Autopilot wurde nun bewusst überdrückt um die Banklage zu erhöhen. Nachdem sich jedoch nicht wie erwartet die Sicht wieder verbesserte, leitete ich einen						
Stellungnahme FB: Eintrag FSB, 27.05.19: Seitens des FSB ist angedacht, dass der Flug samt diesem Ereignis mit der betroffenen Besatzung nachbesprochen wird. Inhaltlich soll Folgendes besprochen werden: - wie geht es der Besatzung? - chronologische Aufarbeitung des Fluges - Gefahren und Risiken frühzeitig erkennen - Inadvertent IMC: Wie kann ich es verhindern und was ist zu tun, wenn es doch passiert. - MCC / CRM, Gefahrenbewusstsein, HFACS						
Einstufung (Gefahren/Risikoanalyse)						
Auswirkung/-Konsequenz	Personen	Material	Umwelt	Reputation	Sicherheit	Wahrscheinlichkeit
	0	0	1	2	4	3
Einstufung des Vorfalls:						Bewertung
LEVEL B						12
<div>1 FOLGEMAßNAHMEN 0 BILDER HELP BIRDSTRIKE FORMULAR DATENSATZ BEARBEITEN</div>						
Datensatz: 1 von 1 Gefiltert Suchen						



Investigation

➤ **contacting the crew**

➤ **risk assessment of the incident**



➤ **discussion of the incident in the safety board /  
coordination of further measures**



➤ **processing of the incident with the crew**

- detailed course of the flight, analysis of the error chain
- clarification of further operational capability (PIC/TCM/OPR)
- 4 hours in the FFS for processing and analysis



➤ **defining the follow-up measures with flight  
operation & training organisation**







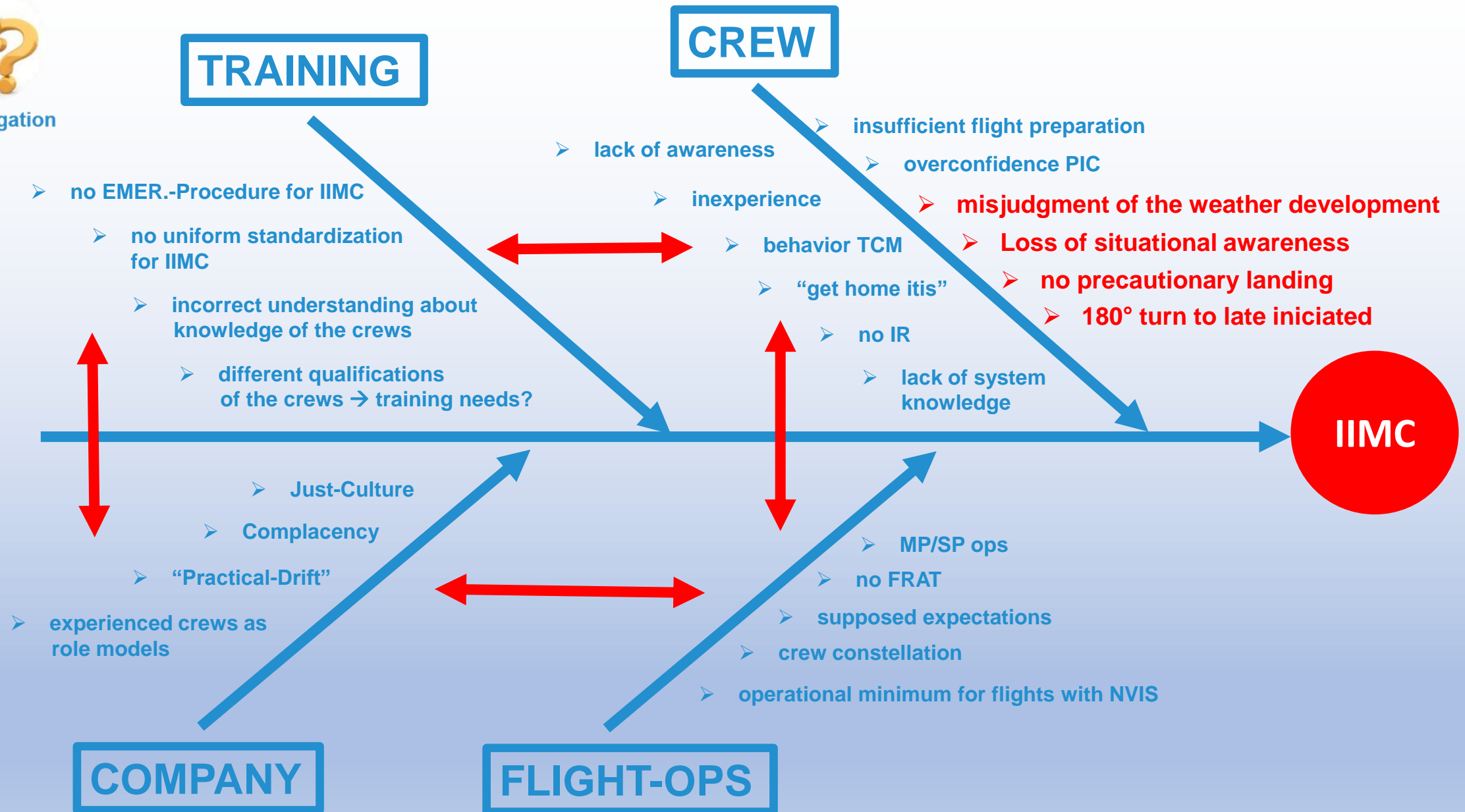
Investigation

# asking questions leads to...





Investigation



**Cause & Contributing Factors**



**Measures /  
Actions**

**FLIGHT-  
OPS**

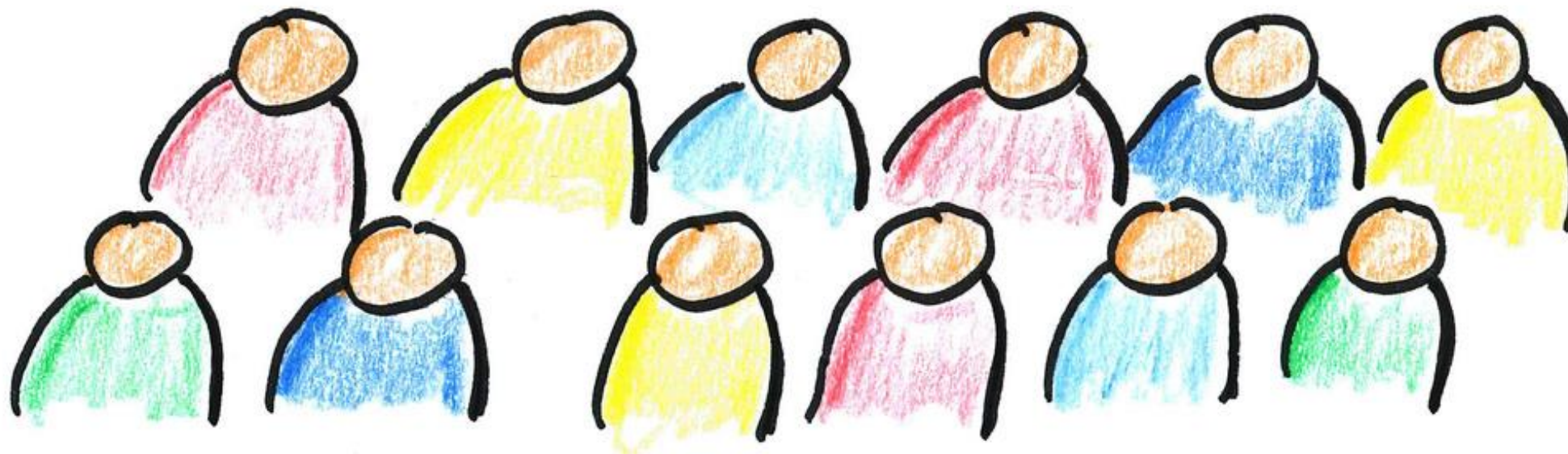
**TRAINING**





FLIGHT-  
OPS

- „get home itis“  
- Expectations  
- No mission is more important  
than your own life and that of  
the crew! „Land & Live“





## Measures / Actions



**Land  
& LIVE**  
AN HAI SAFETY PROGRAM

The successful completion of your flight is important to us. However, the safety of your flight is our highest priority. We will not compromise the safety of our flight crews to complete a mission.

***Polizeifliegerstaffel Hessen***

*Company Name*

supports our pilots' decision to make a precautionary landing when, in their judgment, it is the safest thing to do.

*Leiter der Polizeifliegerstaffel Hessen*



## **Land & LIVE: Update to our Flight-Safety-Policy**

The *Polizeifliegerstaffel Hessen* supports the decision of pilots to execute precautionary landings when continued safety of flight is in perceived or actual jeopardy. Examples of hazardous situations include, but are not limited to, deteriorating or unsafe weather conditions, uncertainty of aircraft integrity, or potential incapacitation of a required crew member.

The *Polizeifliegerstaffel Hessen* affirms by this policy that all decisions to execute precautionary landings performed with reasonable care will be supported and will not result in any personnel action that could be considered punitive. As part of our company just culture, this affirmation extends even to cases where the precautionary landing was made as a result of inadequate planning or preparation, or even in cases of questionable judgment.

Accident prevention is the objective of this policy. Therefore the *Polizeifliegerstaffel Hessen* accepts that any inconvenience, cancellation of missions, or costs associated with precautionary landings is in the best interests of our company and the health and well-being of all of its employees.

**Land  
& LIVE**  
AN HAI SAFETY PROGRAM



## Land & LIVE - Only You Can Decide to Stay Alive

*It's All About Saving Lives*

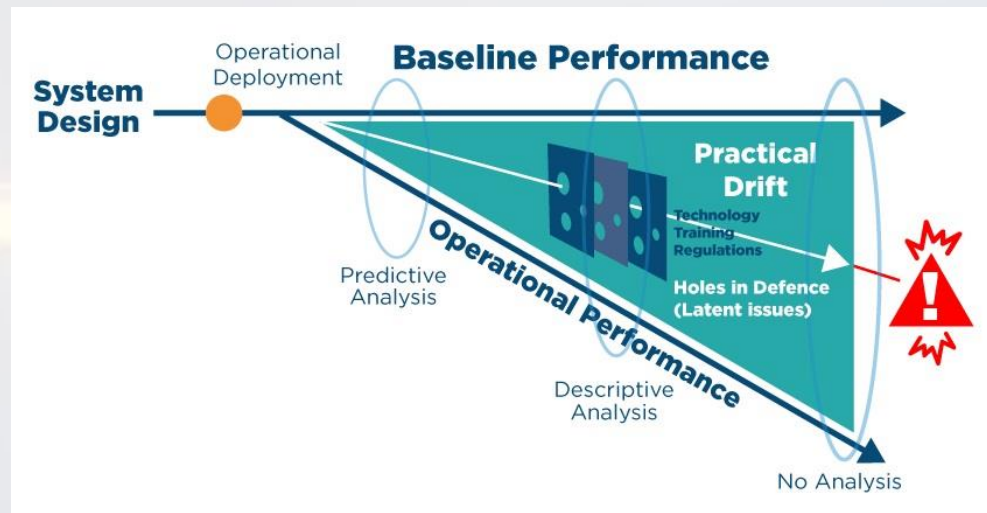




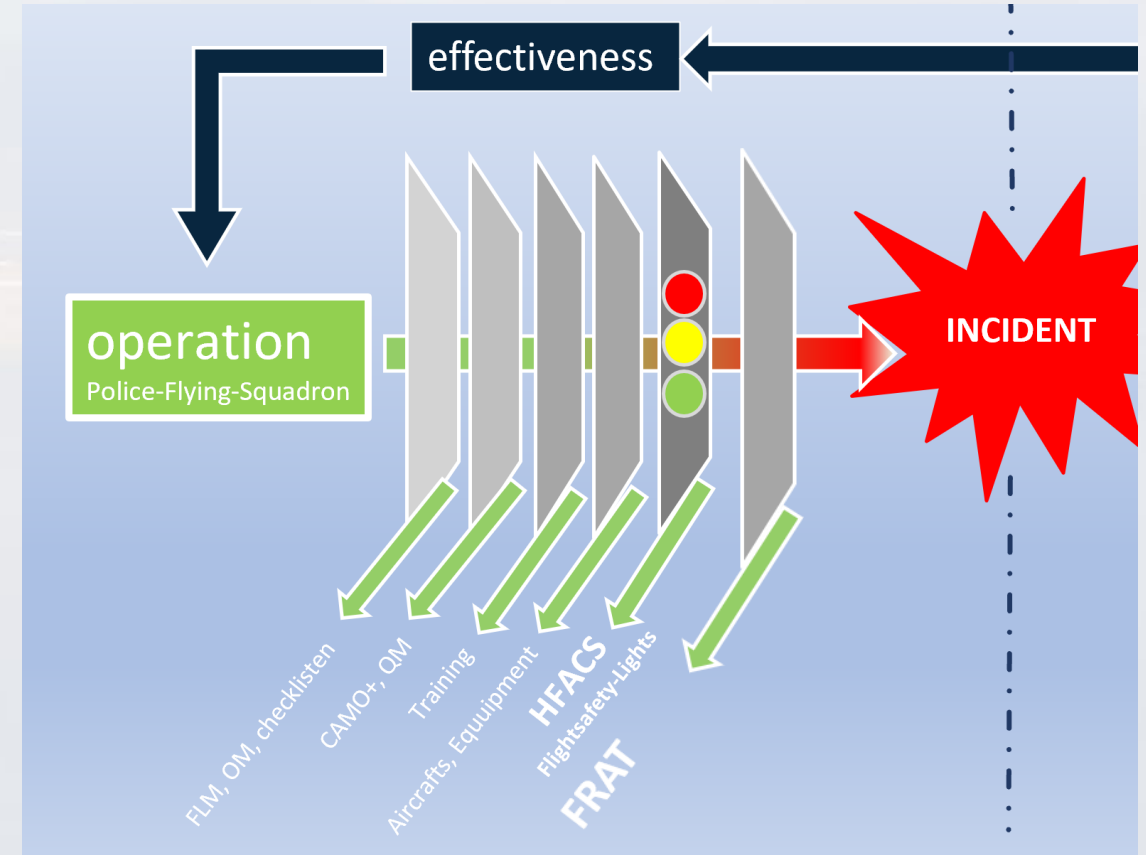


Measures /  
Actions

# Implementation of Flight Risk Assessment Tool (FRAT)



**Complacency**





## Measures / Actions

# Implementation of Flight Risk Assessment Tool (FRAT)

**GYRONIMO<sup>®</sup> FLIGHT PAD** Flight Risk Assessment Tool CLOSE

**Risk Assessment: EASA Daily Normal Ops**

**Flight #1**

PIC:

SIC:

Remarks:

AC Registration:

Date:

Complete a risk assessment, then save it as a preset (on Result P...  
Once saved, you can load the preset here:

Preset:

**MISSION RISK LEVEL**

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**GYRONIMO<sup>®</sup> FLIGHT PAD** Flight Risk Assessment Tool CLOSE

**04 : WEATHER**

Ceiling:

Visibility:

Winds:

Convective Activity:

Forecast conditions:

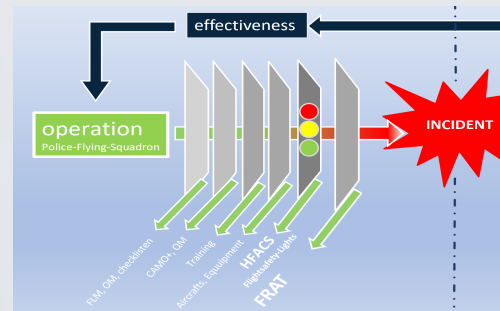
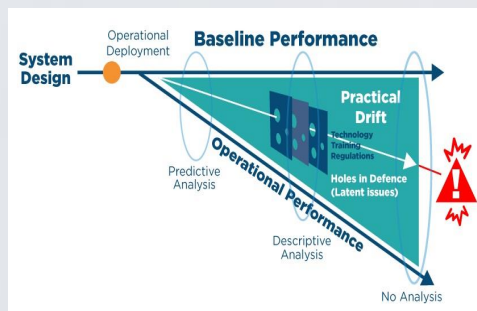
Terrain:

Fog:

Icing:

**MISSION RISK LEVEL**

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**Measures /  
Actions**

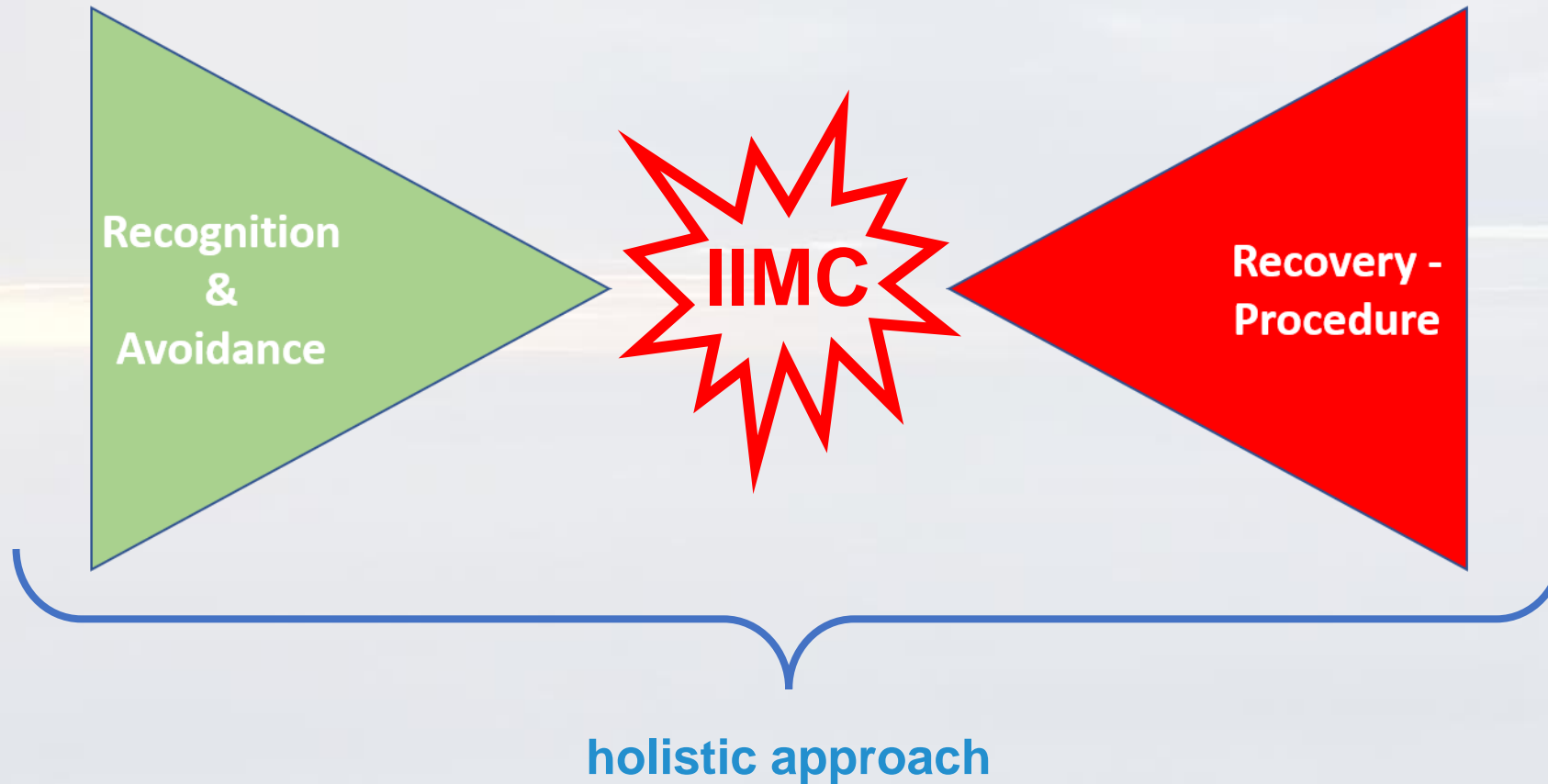
**FLIGHT-  
OPS**

**TRAINING**



Measures /  
Actions

## Need for changed training regarding DVE & IIMC





Measures /  
Actions

## Recognition & Avoidance

preflight-planning

know limits

possible risks

communicate

plan B

precautionary Landing

It's all  
about  
mindset!

### How to avoid IIMC:

- complete weather information before T/O (METAR, TAF, NVIS, etc.)
- note the weather development during the flight (precipitation, fog, etc.)
- Awareness when flying with NVIS
- note terrain structures, bad weather routes
- perform a precautionary landing or turn around
- communicate concerns within the crew
- aviate, navigate and communicate



**IHST**

International Helicopter Safety Team  
Our Vision: An International Civil Helicopter Community With Zero Accidents

Training Fact Sheet – Inadvertent Entry Into  
Instrument Meteorological Conditions (IIMC)



# VFR INTO IMC

A syllabus designed to help protect pilots against GA's most fatal type of weather-related accident: VFR into IMC. Recommended for use by flight instructors and schools.



## Measures / Actions

# Recovery-Procedure A&E-Checklist → EMERGENCY Procedure

## VERSEHENTLICHER EINFLUG IN IMC

[TOC](#)

Plötzliche räumliche Disorientierung durch unbeabsichtigten Einflug in IMC

### Procedure

#### 1. Maintain aircraft control:

- |                        |                     |
|------------------------|---------------------|
| - Bank angle .....     | Check neutral       |
| - Pitch attitude ..... | Check neutral       |
| - Power setting .....  | adjust as necessary |

if Instrument Meteorological Conditions still remaining

#### 2. Collective Pitch ..... Raise to MCP (if necessary)

#### 3. APMS - HDG, ALT.A ..... Select, Airspeed min. 65 KIAS

#### 4. Climb to Sector MSA ..... Establish, Airspeed min. 80 KIAS

**NOTE** Mit Hilfe des GTN 750 Fluchtweg festlegen, im MAP Menü Terrain aktivieren, unter Beachtung des Terrains und möglicher Hinderniskulisse, schnellstmöglich auf eine sichere Höhe steigen.

#### 5. XPDR ..... Squawk 7700

#### 6. ATC ..... Contact, Mayday Call, (ggf. 121.5 Mhz),

### FORDEC

Facts	Kraftstoffvorrat überprüfen .....	Max. Flugzeit?
	OAT .....	Vereisung?
	Nearest Airport .....	Militärisch(GCA) oder zivil (ILS)
	Wettercheck .....	Über Radar, Dienststelle, EFB etc.
Options	Gibt es Flugplätze, die ohne Instrumentenanflug erreichbar sind? Ist das Wetter lokal begrenzt? Gibt es Höhenzüge (z. B. Taunus, Rhön), die erreichbar sind?	
Risks	Kraftstoffmangel? Vereisung? Instrumentenanflug?	
Decision	Welcher Flugplatz/Landeplatz wird ausgewählt?	
Execution	ATC informieren und das Verfahren absprechen	
Check	Entscheidungen überprüfen	

#### 7. ATC ..... Request Radar Vectors for ILS ...

## VERSEHENTLICHER EINFLUG IN IMC

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### 8. Cockpit Preparation

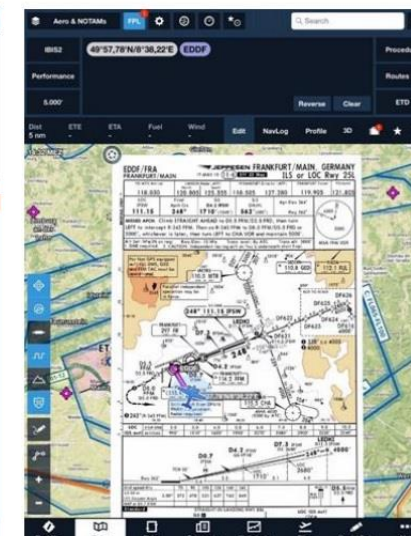
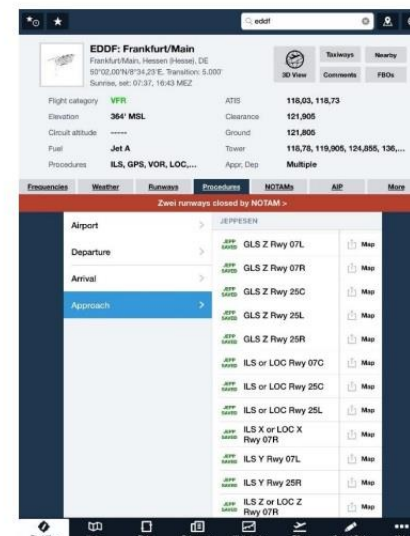
#### GTN 750:

- |                                 |                        |
|---------------------------------|------------------------|
| HOME pb .....                   | Press                  |
| Procedure .....                 | Press                  |
| Approach .....                  | Press                  |
| Airport .....                   | Select                 |
| Procedure .....                 | Select (z. B. ILS 25R) |
| LOAD Approach & Activate .....  | Press                  |
| ILS Frequency (GTN 1 & 2) ..... | Activate (Flip – Flop) |

Der Anflug ist im GTN 750 vorbereitet. Der Flugplan wurde aktualisiert.

### 9. Anflugvorbereitung FOREFLIGHT

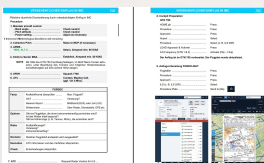
- |                           |                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------|
| Flughäfen .....           | Press                                                                                           |
| Procedure .....           | Press                                                                                           |
| Approach .....            | Press                                                                                           |
| ILS (z. B. ILS 25R) ..... | Select                                                                                          |
| Procedure Plate .....     | Send to Map  |







## Measures / Actions



# Recovery-Procedure A&E-Checklist → EMERGENCY Procedure

## VERSEHENTLICHER EINFLUG IN IMC

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### 10. Flugplan FOREFLIGHT erstellen

Karten .....	Press
FPL (Titelzeile oben) .....	Press
Flughafen (z. B. EDDF) .....	ICAO Identifier eingeben (mit Enter oder Leertaste bestätigen)
ICAO Identifier im FPL Fenster .....	Press, select Direct To

Das Anflugblatt wurde in die Kartendarstellung eingegliedert und es wird eine direkte Kurslinie zum Zielflughafen angezeigt.

11. ICP PIC .....	Select ILS 2
12. ICP CoPi .....	Select ILS 1
13. ICP - Course Selector .....	Set Final Track
14. ICP - NAV Needles (sgl./dbl. Pointer) .....	NMS
15. ICP - Decision Height .....	Set 200 ft

### 16. Before Landing Checklist

Altimeters .....	Compare
All Instruments .....	Check
All warnings and caution indications .....	Check
N <sub>2</sub> /N <sub>R</sub> .....	Check
Co-Pilot Monitor .....	Check stowed
Cabin .....	Prepare for LDG
Landing Light .....	ON
Approach Briefing .....	Perform (Runway, Approach, WX, Escape)

### Instrumentenanflug

**NOTE** Die nachfolgenden Punkte werden nach der Freigabe für den Anflug z. B. "Cleared ILS Approach RWY XY, report established" abgearbeitet.

### 17. APMS

APP .....	Press, Amber light on
G/S .....	Press, Amber light on

**NOTE** APP and G/S will illuminate green when captured.

18. PFD .....	UPPER MODES <b>LOC</b> ; <b>G/S</b> green
19. Airspeed .....	Check. max. 100 KIAS
20. ILS Indications LOC, GS .....	Monitor closely

## VERSEHENTLICHER EINFLUG IN IMC

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**ATTENTION** Bei Abweichungen der LOC oder G/S Anzeige aus der Center Position, ohne Korrektur durch den A/P

APMS – HDG, ALT.A .....	Select RWY track, climb to sector MSA (according to ILS approach chart)
ATC .....	Inform, request radar vectors back to ILS approach, follow the instructions given by ATC

21. At 500ft AGL .....	Flight Controls: Hands on – fly attentively ( <b>AP remains ON</b> )
------------------------	-------------------------------------------------------------------------

22. At 200ft AGL (DH) .....	RWY in sight?
-----------------------------	---------------

when RWY in sight:

AP MD DCPL (on Stick) .....	Press
Landing .....	Perform

when RWY NOT in sight

Refer to following **NOTE**

**NOTE** Die nachfolgende Handlungsanleitung ist nur gedacht für den absoluten Notfall, falls bei schlechten Wetterbedingungen das A/C am Minimum (im ILS Approach ca. 200 ft AGL) nicht in VMC ist.

A/P aufgeschaltet lassen, A/P wird in 65 ft AGL den Sinkflug beenden und horizontal fliegen.

Collective Pitch langsam absenken, die Fluggeschwindigkeit wird beginnen sich zu verringern. Bei ca. 60 KIAS wird der A/P die 65 ft AGL nicht mehr halten können, die Maschine beginnt zu sinken. Sinkrate von 100 ft bis max. 200 ft mit einer Fluggeschwindigkeit von max. 50 KIAS über den Collective Pitch einstellen.

Geschwindigkeit weiter verringern, zur Landung AP MD DCPL und Landung durchführen.



## **Lesson Learned**

**Flights at night using NVIS are particularly endangered for flights in DVE and this increases the risk of IIMC.**



## Lesson Learned

Flights at night using NVIS are particularly endangered for flights in DVE and this increases the risk of IIMC.

**In order to avoid a false sense of safety with regard to DVE and IIMC, the training approach must be focused on recognition and avoidance.**



## Lesson Learned

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**NO TRAINING → NO SAFETY OF ACTION**  
**NO SAFETY OF ACTION → NO SAFE OPERATION**





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**NO SAFETY OF ACTION → NO SAFE OPERATION**

**Adaptation of procedures and training methods to the experience and skills of the crew.**



## Lesson Learned

Rights of flight using NATS are particularly endangered for  
Rights in DVE and this increases the risk of IMC.

In order to avoid a false sense of safety with regard to DVE  
and IIMC, the training approach must be focused on  
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**NO TRAINING → NO SAFETY OF ACTION  
NO SAFETY OF ACTION → NO SAFE OPERATION**

**Adaptation of procedures and training methods to the  
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## **awareness and standardization of instructors**

In addition to the *Technical-Skills*, the *Non-Technical-Skills* must also  
be trained.



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NO SAFETY OF ACTION → NO SAFE OPERATION

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experience and skills of the crew.

**awareness and standardization of instructors**

In addition to the *Technical-Skills*, the *Non-Technical-Skills* must also  
be trained.

**The pilot's qualification should be of the same level as  
the operation being performed and equal to the  
aircraft's certification.**



## Lesson Learned

"No Safety of Action"  
Adaptation of procedures and training methods to the experience and skills of the crew.  
awareness and standardization of instructors  
In addition to the Technical-Skills, the Non-Technical-Skills must also be trained.

The pilot's qualification should be of the same level as the operation being performed and equal to the aircraft's certification.

GOAL for Flight-Safety

PIC IR SP/MP ops as a standard for NVIS operation

Renewal of IFR-Ratings in our Company

implementation of own measures

2020

2023

20...?

VISION









**Thank you for your  
attention**



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