

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

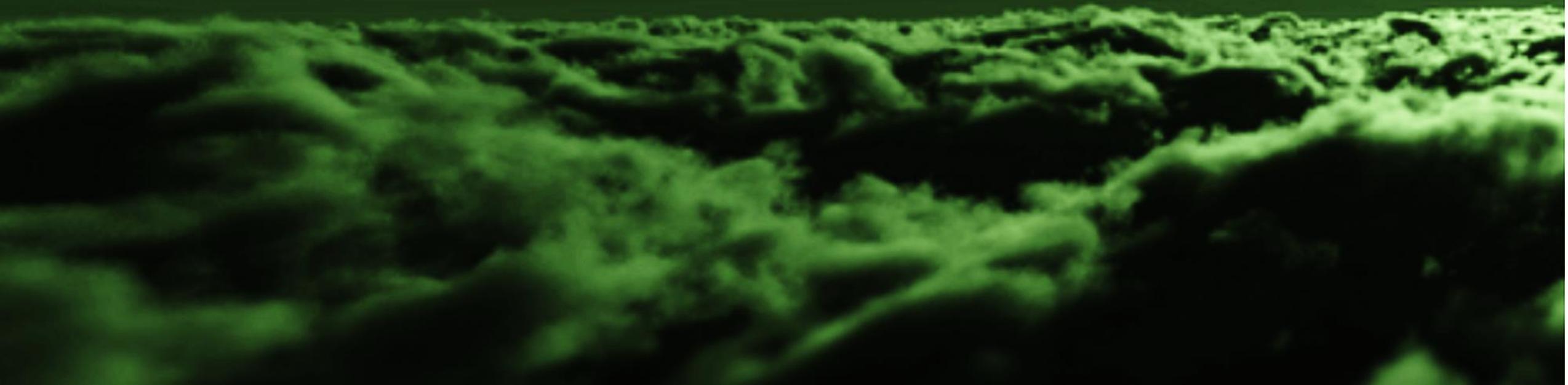




nachgestellt

SITUATION

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



SITUATION

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

90 liters fuel remaining
in the main tank

SITUATION

over a closed cloud layer and no more
chance for a precautionary landing
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Pilot without IR and unable to
make the setting for an ILS at
the next airport

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SITUATION

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

90 liters fuel remaining
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Crew:

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

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

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



We believed...

what we believed

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

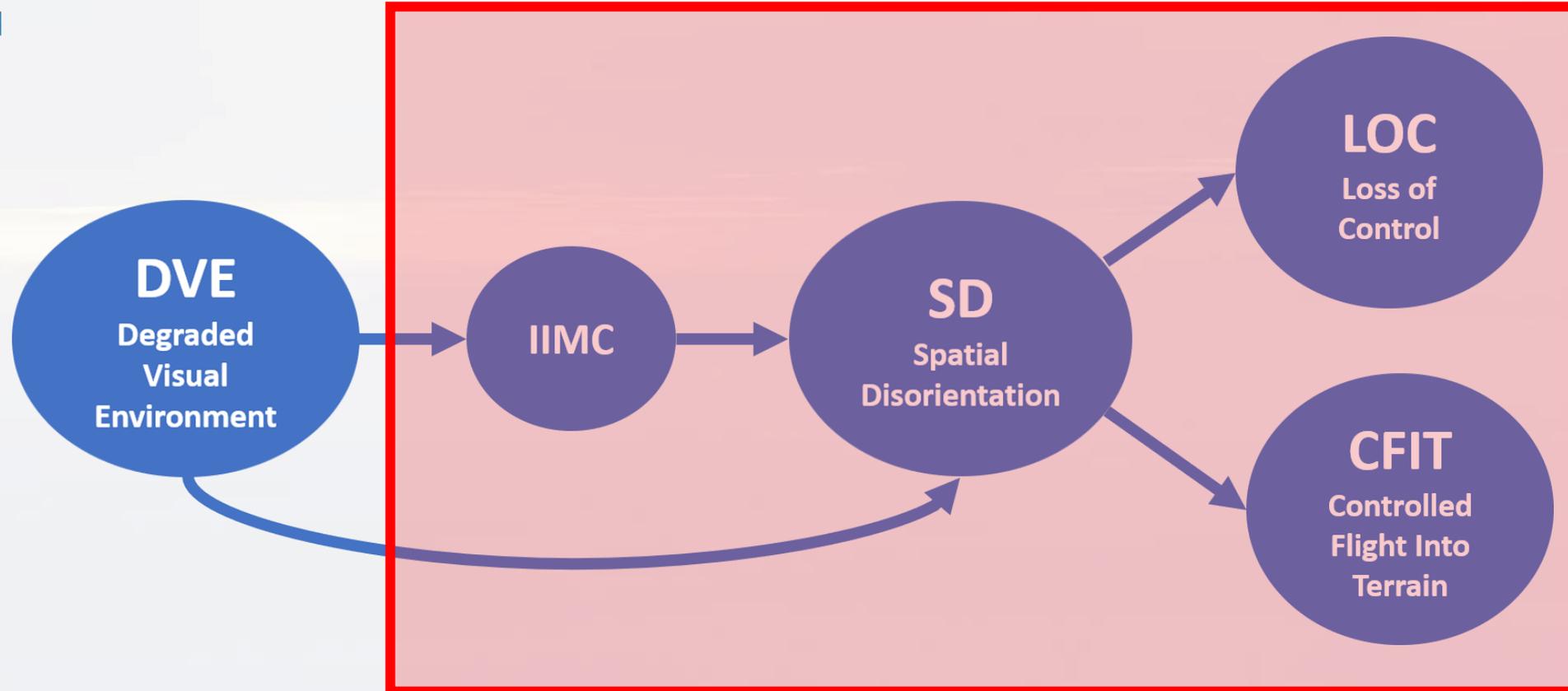
...that we had good Operation Manuals & Procedures





what we
believed

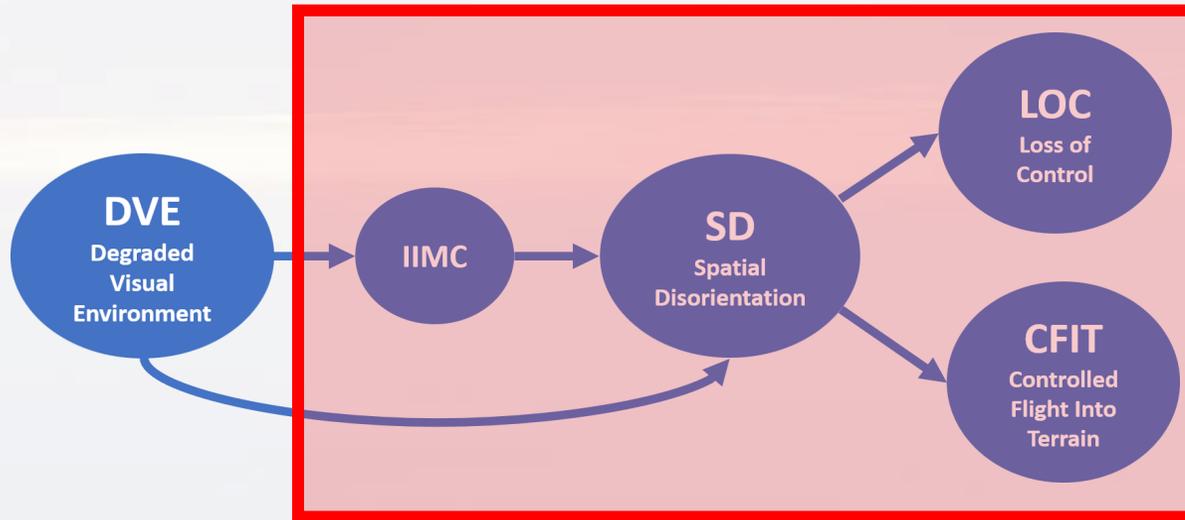
...to avoid:





what we
believed

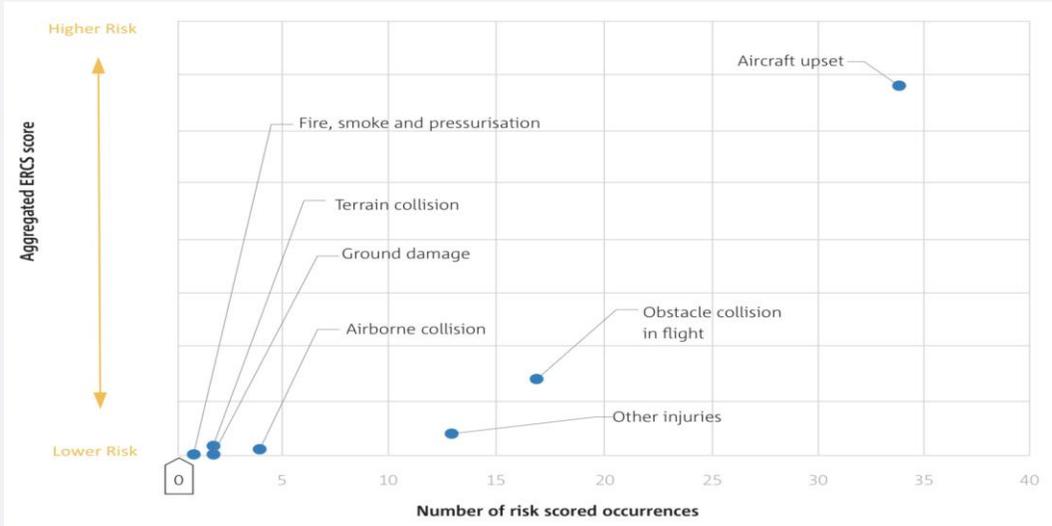
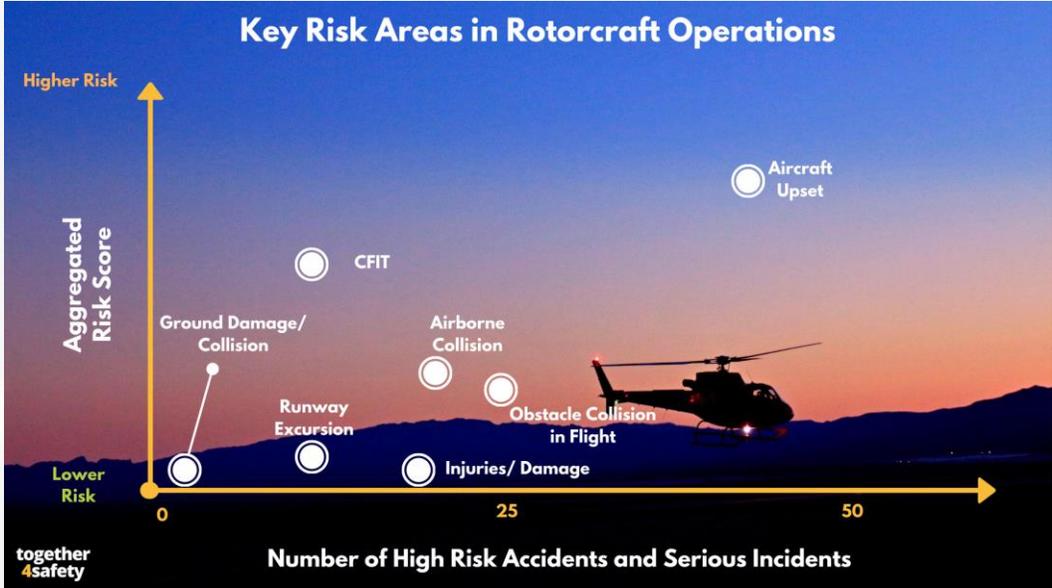
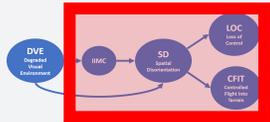
...to avoid:





what we believed

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



Statistic
2009 - 2019





what we
believed

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

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

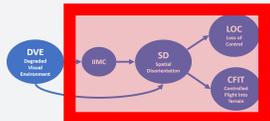
01.12.2019, EC145, F-ZBPZ, Sécurité Civile (Dragon 30), Rescue Mission, 3 Fatals

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

11.12.2018, Sikorsky S76B, D-HHNH, „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 Fatals





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

proactive process

reactive process

effectiveness

information
- Safety-Report
- Informations
- etc...

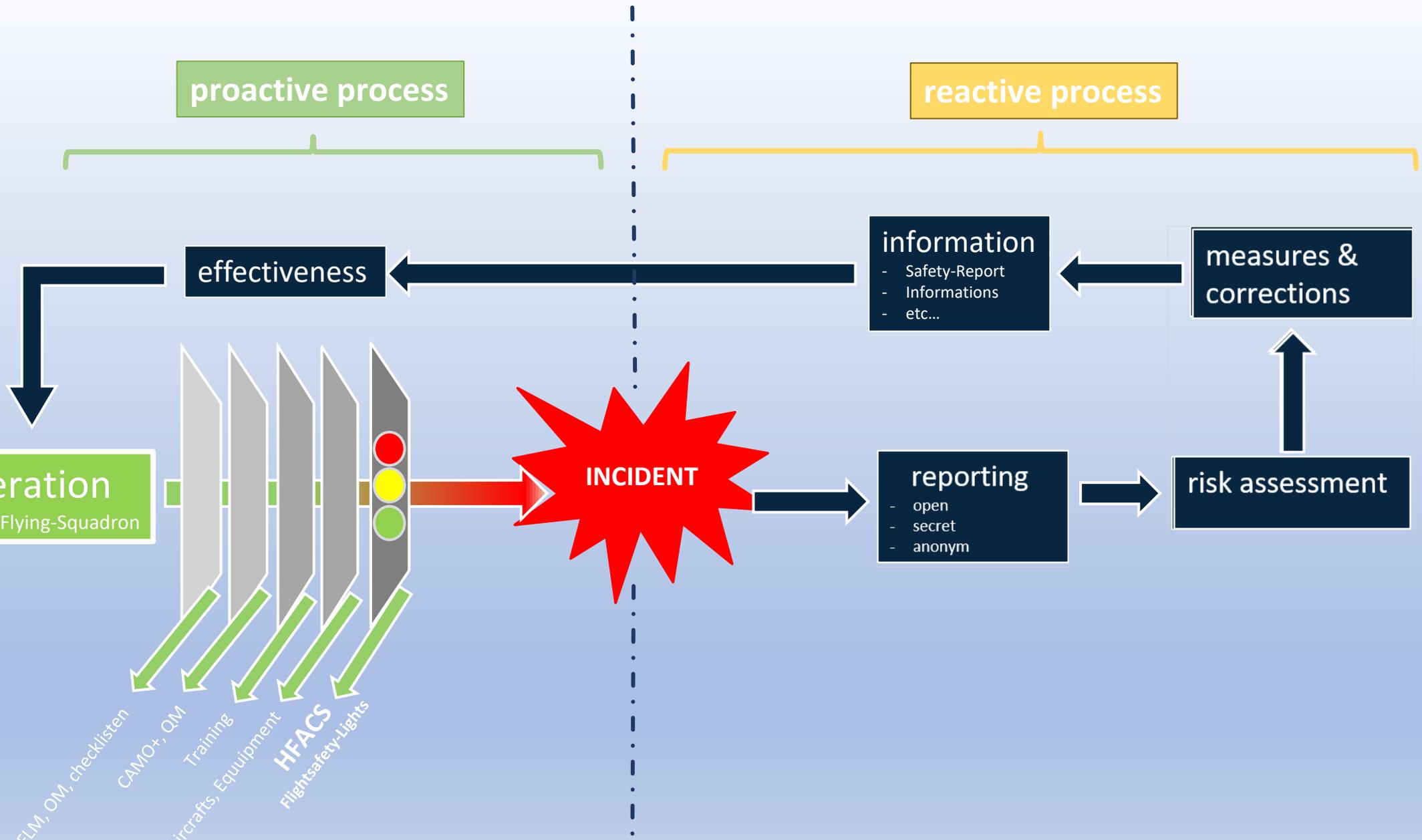
measures & corrections

operation
Police-Flying-Squadron



reporting
- open
- secret
- anonym

risk assessment





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-Kus 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	Bewertung
	0	0	1	2	4	3	12

Einstufung des Vorfalls: **LEVEL B**

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...

Surface



operation

latent errors

training

event (incident)

active failures

preconditions

organisation

just culture

...answers

Deepness



Investigation

TRAINING

CREW

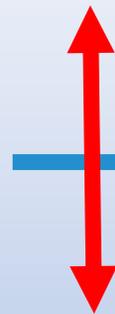
- no EMER.-Procedure for IIMC
- no uniform standardization for IIMC
- incorrect understanding about knowledge of the crews
- different qualifications of the crews → training needs?

- lack of awareness
- inexperience
- behavior TCM
- "get home itis"

- insufficient flight preparation
- overconfidence PIC
- **misjudgment of the weather development**
- **Loss of situational awareness**
- **no precautionary landing**
- **180° turn to late initiated**

- no IR
- lack of system knowledge

IIMC



COMPANY

FLIGHT-OPS

- Just-Culture
- Complacency
- "Practical-Drift"
- experienced crews as role models

- MP/SP ops
- no FRAT
- supposed expectations
- crew constellation
- operational minimum for flights with NVIS

Cause & Contributing Factors



**Measures /
Actions**

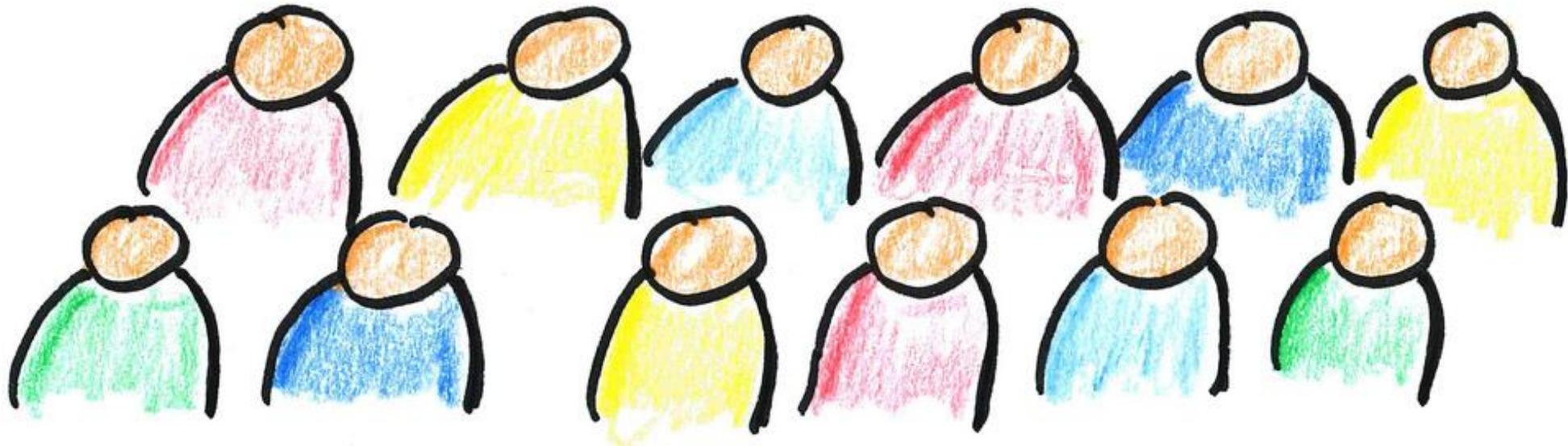
**FLIGHT-
OPS**

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



The successful completion of your flight is important to us. However, your safety and 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.

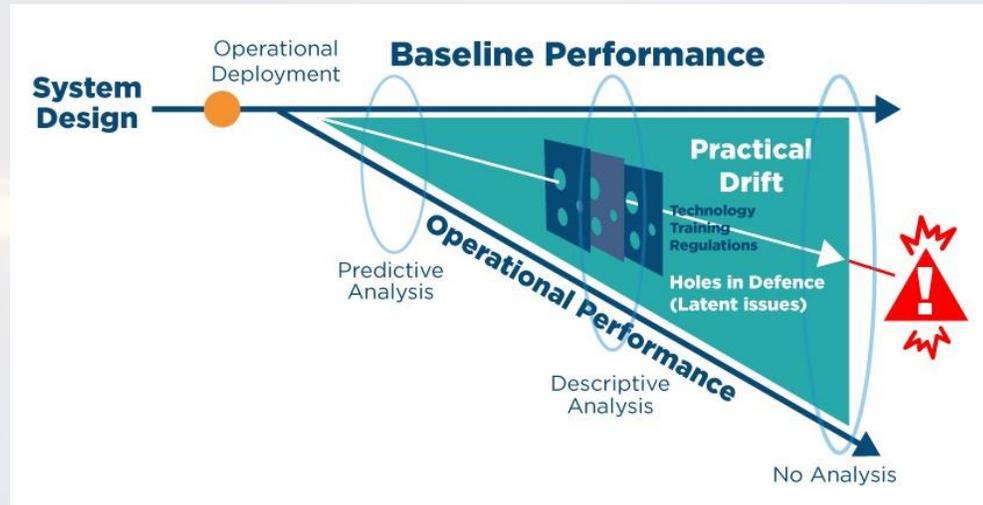
Accident prevention is the objective of this policy. Therefore the *Polizeifliegerstaffel Hessen* accepts that any inconvenience, cancellation of missions, or costs associated with precautionary landings is in the best interests of our company and the health and well-being of all of its employees.



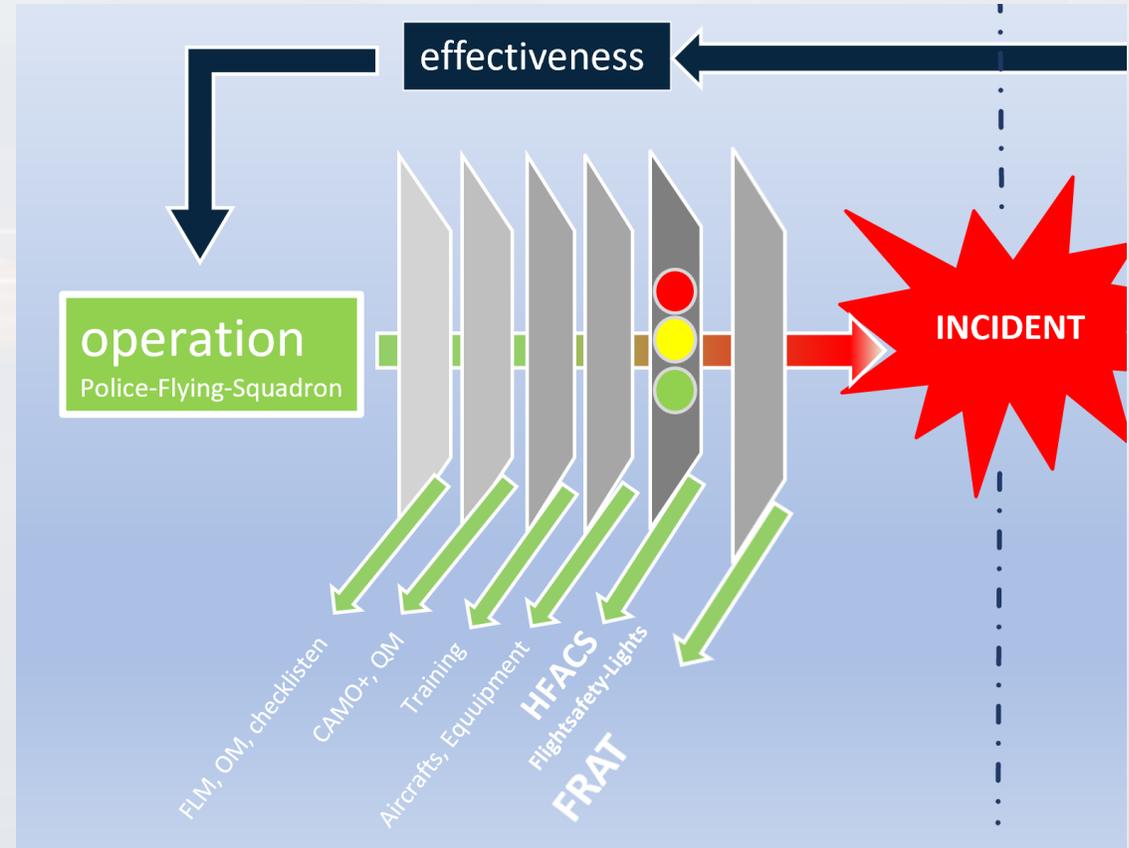



Measures /
Actions

Implementation of Flight Risk Assessment Tool (FRAT)



Complacency





Implementation of Flight Risk Assessment Tool (FRAT)

Measures / Actions

GYRONIMO 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 FLIGHT PAD Flight Risk Assessment Tool CLOSE

04 : WEATHER

Ceiling:

Visibility:

Winds:

Convective Activity:

Forecast conditions:

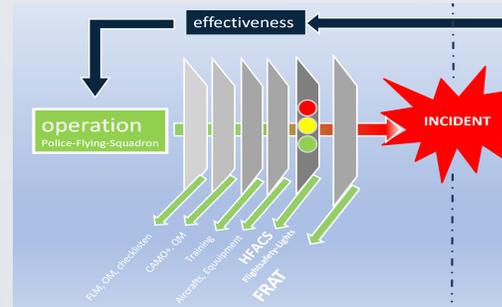
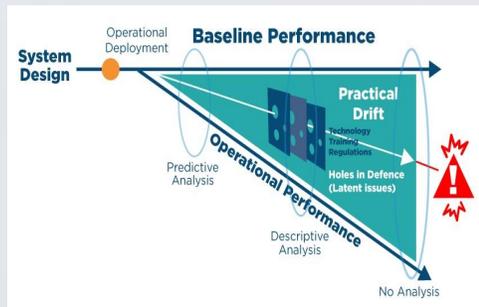
Terrain:

Fog:

Icing:

MISSION RISK LEVEL

7 / 48





**Measures /
Actions**

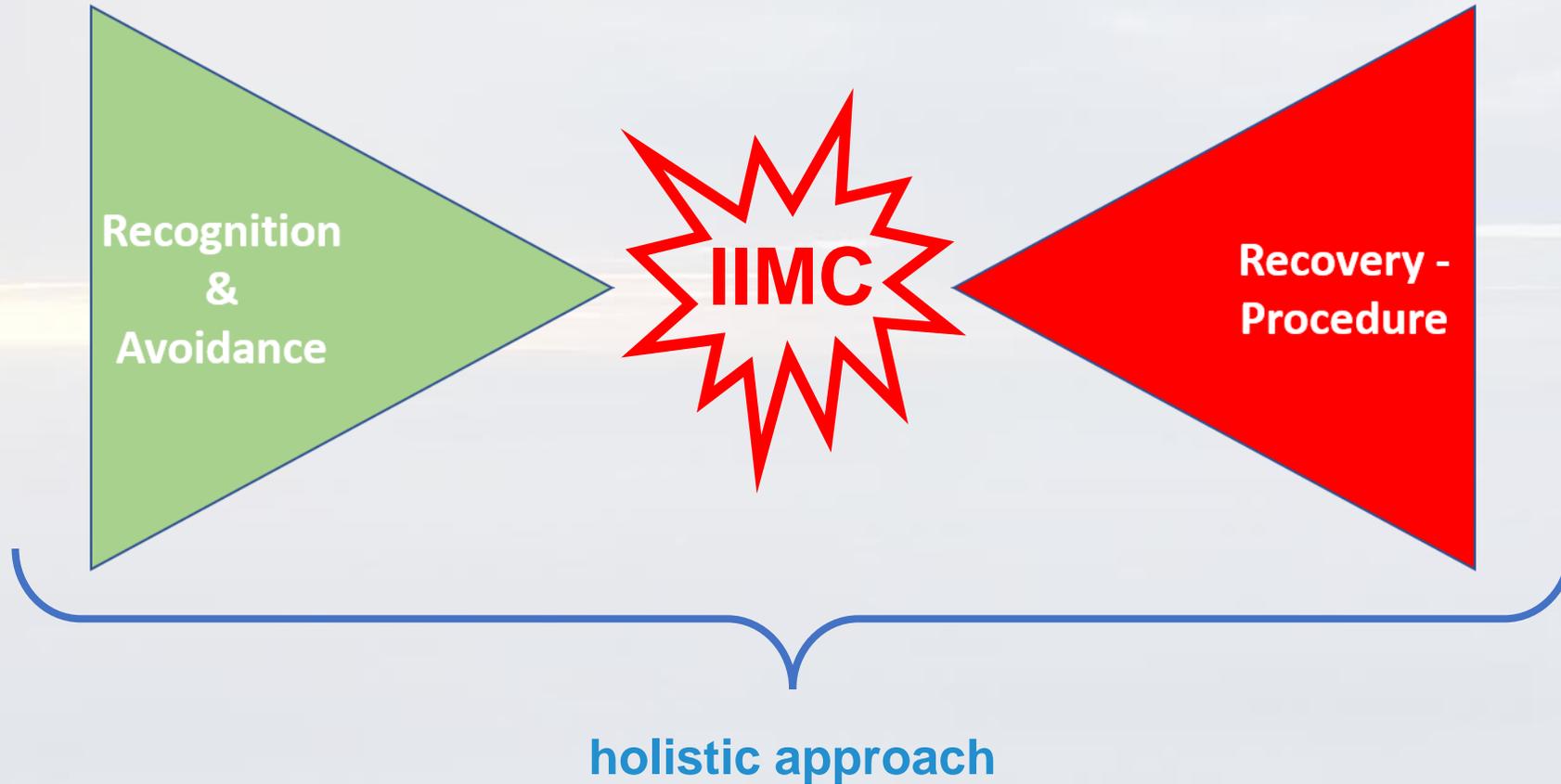
**FLIGHT-
OPS**

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)



AOPA AIR SAFETY
INSTITUTE

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 TOC

8. Cockpit Preparation

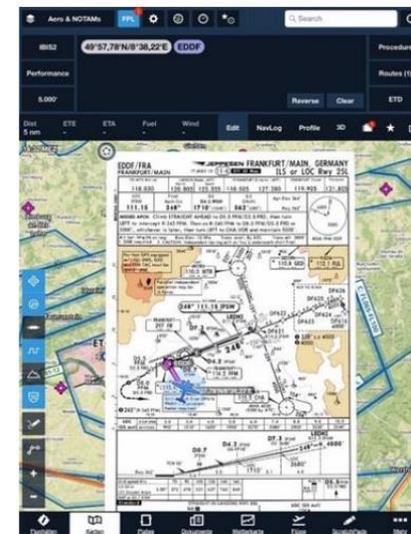
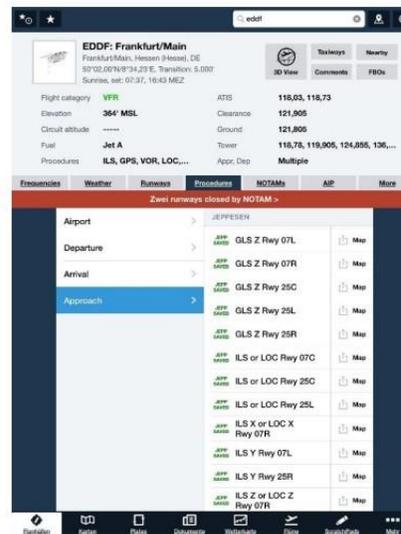
GTN 750:

- | | |
|---------------------------------|------------------------|
| 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.

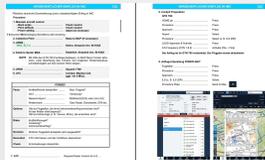
9. Anflugvorbereitung FOREFLIGHT

- | | |
|---------------------------|-------------|
| 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 TOC

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
- N₂/N_R 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 **LOC; G/S** green
- 19. Airspeed Check. max. 100 KIAS
- 20. ILS Indications LOC, GS Monitor closely

VERSEHENTLICHER EINFLUG IN IMC TOC

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 (**AP remains ON**)
- 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



Lesson Learned

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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 experience and skills of the crew.



Lesson Learned

Rights of flight using NTS are particularly endangered for
Rights 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.

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

**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.



Lesson Learned

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**NO TRAINING → NO SAFETY OF ACTION
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In addition to the *Technical-Skills*, the *Non-Technical-Skills* must also
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**The pilot's qualification should be of the same level as
the operation being performed and equal to the
aircraft's certification.**

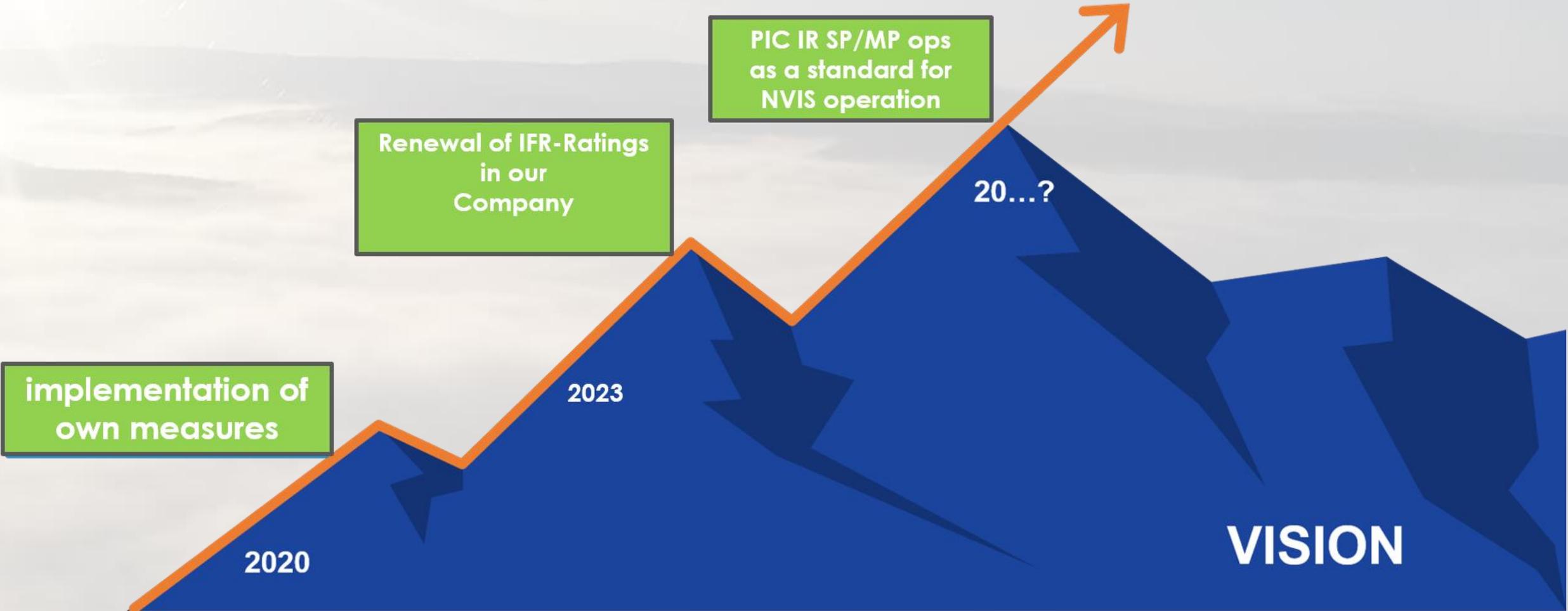


Lesson Learned

NO TRAINING → NO SAFETY OF ACTION
NO SAFETY OF ACTION → NO SAFE OPERATION
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GOAL for Flight-Safety

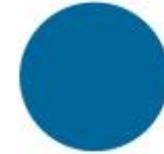








**Thank you for your
attention**



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