

Procedures and Human Work

The Varieties of Human Work

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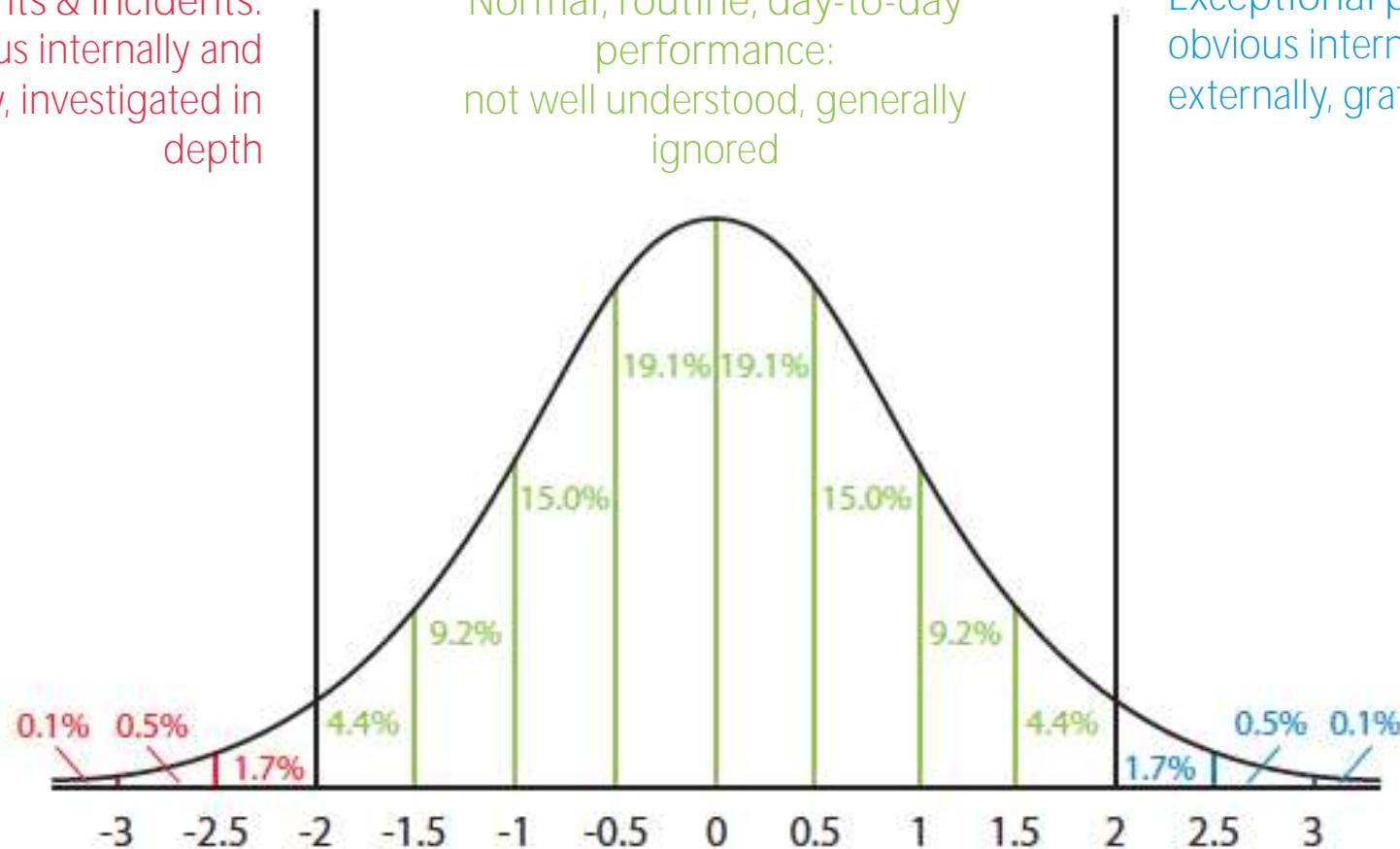
Network Manager Safety Unit

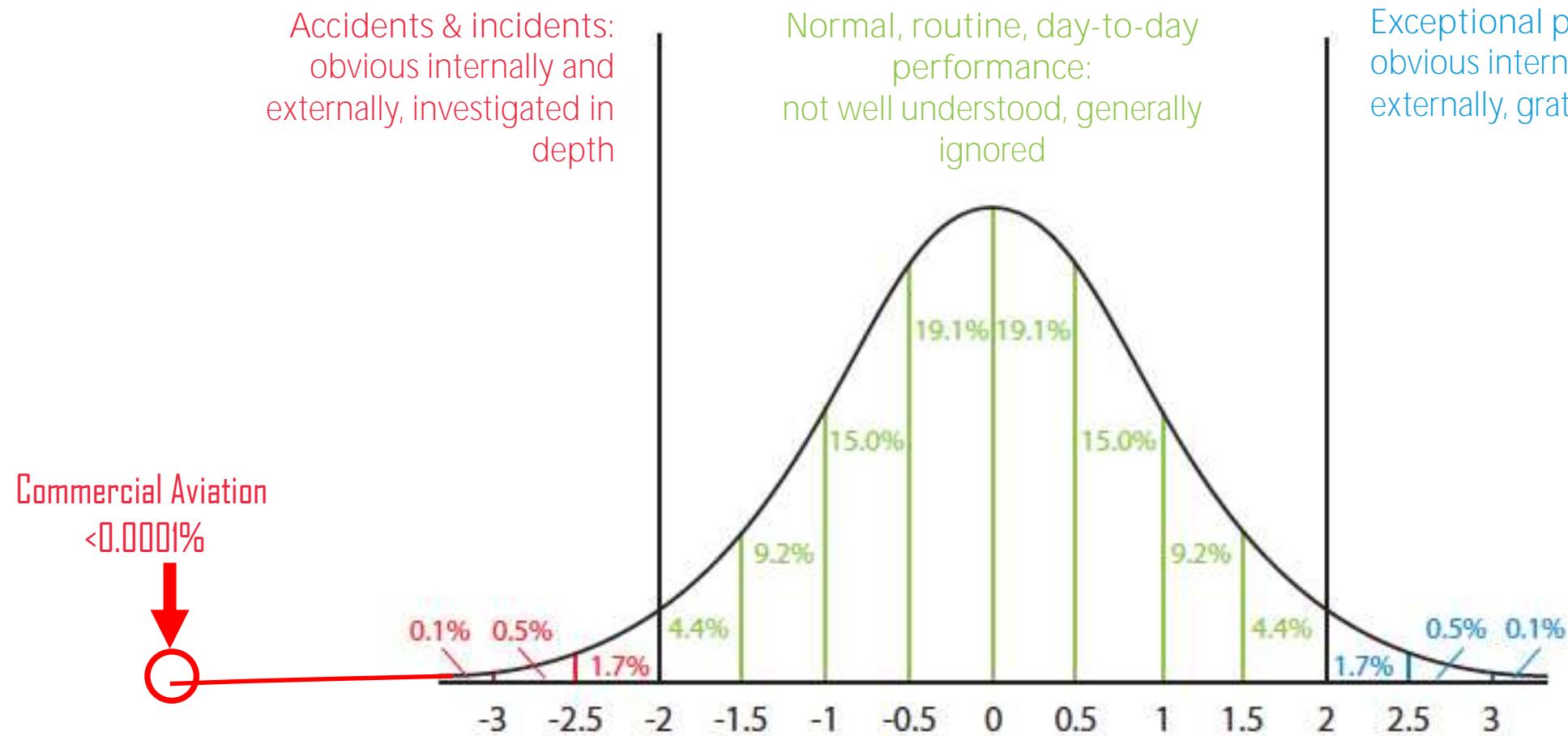
EUROCONTROL Safety Forum, 4-5 June, Brussels

Accidents & incidents:
obvious internally and
externally, investigated in
depth

Normal, routine, day-to-day
performance:
not well understood, generally
ignored

Exceptional performance:
obvious internally, hard to see
externally, gratefully accepted





Accidents & incidents:
obvious internally and
externally, investigated in
depth

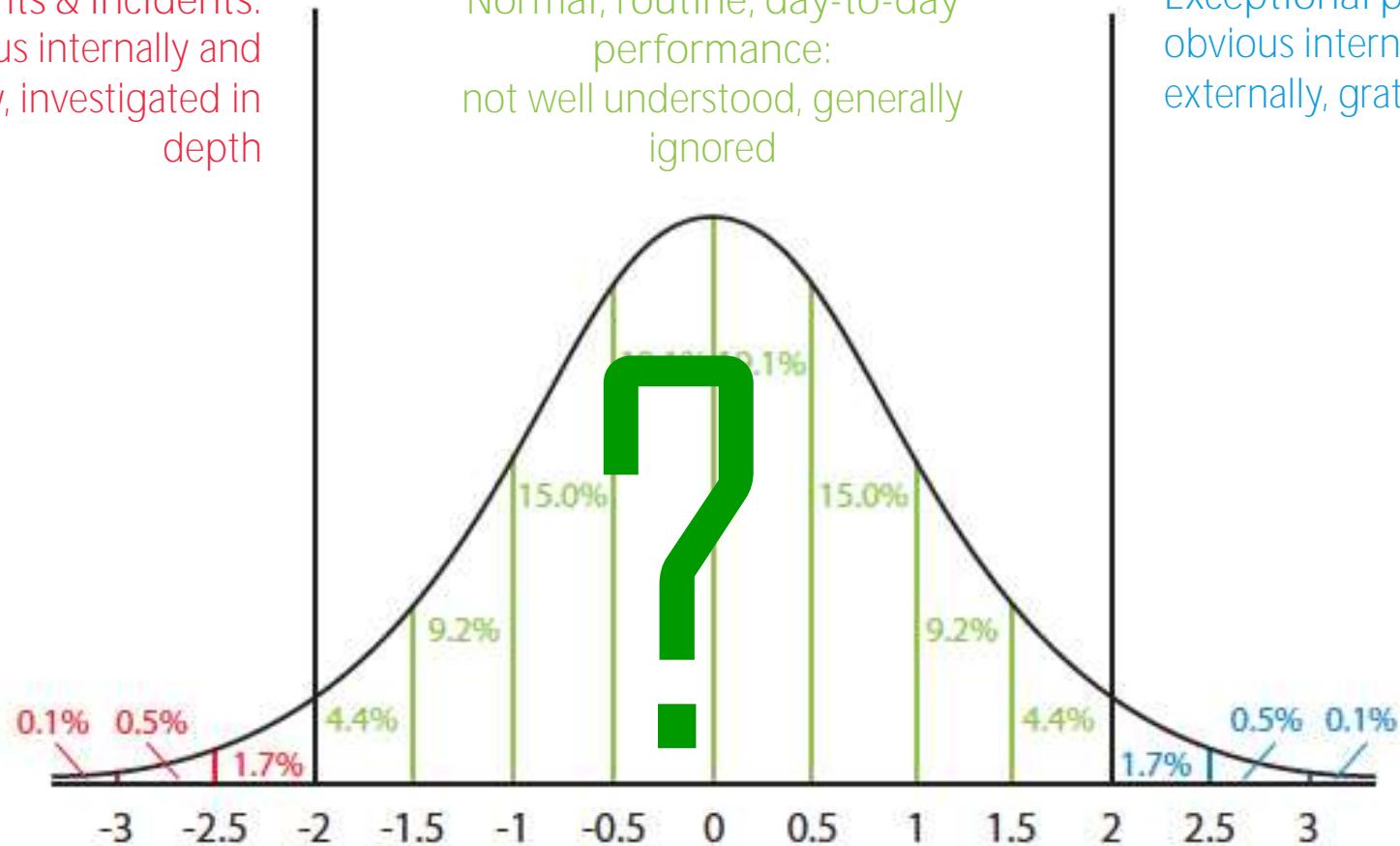


Errors
Unsafe Acts
Failures
Deviations
Violations
Non-compliance
Carelessness
Recklessness

Accidents & incidents:
obvious internally and
externally, investigated in
depth

Normal, routine, day-to-day
performance:
not well understood, generally
ignored

Exceptional performance:
obvious internally, hard to see
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Effective-as-designed?

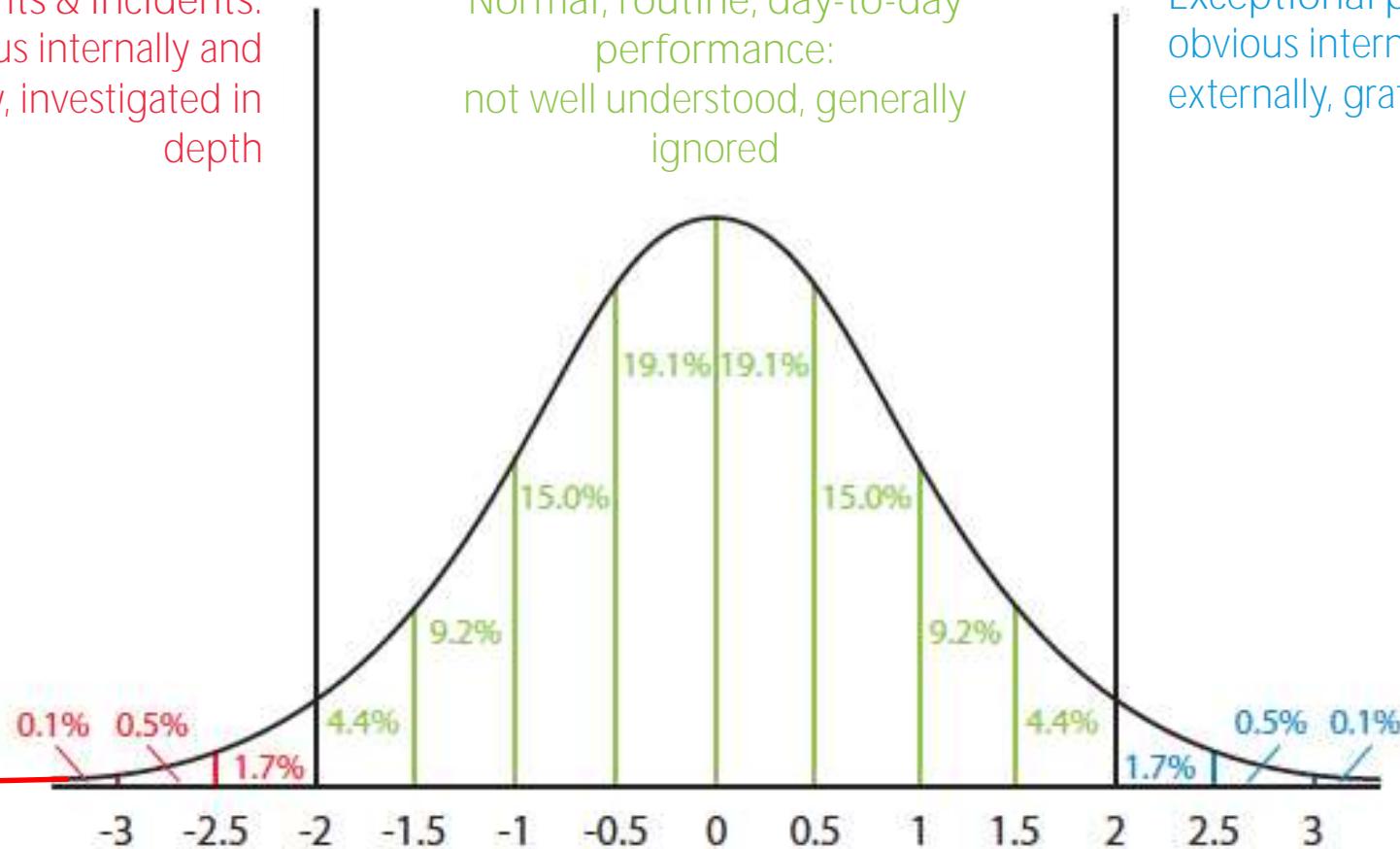
Effective-as-operated?

Accidents & incidents:
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externally, investigated in
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Normal, routine, day-to-day
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Commercial Aviation
<0.0001%

ATCOs	Rank	
C15 We are sufficiently involved in changes to procedures.	3	Red
B18 Changes to the organisation, systems and procedures are properly assessed for safety risk.	11	Red
C08 I receive sufficient safety-related refresher training.	12	Red
C07r We often have to deviate from procedures.	15	Red
B27 Other people in this organization understand how my job contributes to safety.	16	Red
C19 The procedures associated with my work are appropriate.	16	Red
C14r I often have to take risks that make me feel uncomfortable about safety.	18	Yellow
C11 Adequate training is provided when new systems and procedures are introduced.	20	Yellow
C04 The procedures describe the way in which I actually do my job.	32	Yellow
C20 I have sufficient training to understand the procedures associated with my work.	43	Green



THE VARIETIES OF HUMAN WORK



Image: Steven Shorrock CC BY-NC-SA 2.0 <https://flic.kr/p/25wGrGQ>

 **Esselte**

1

WORK

AS

PRESCRIBED



 **Esselte**

2

WORK

AS

PRESCRIBED



 **Esselte**

3

WORK

AS

PRESCRIBED



 **Esselte**

4

WORK

AS

PRESCRIBED

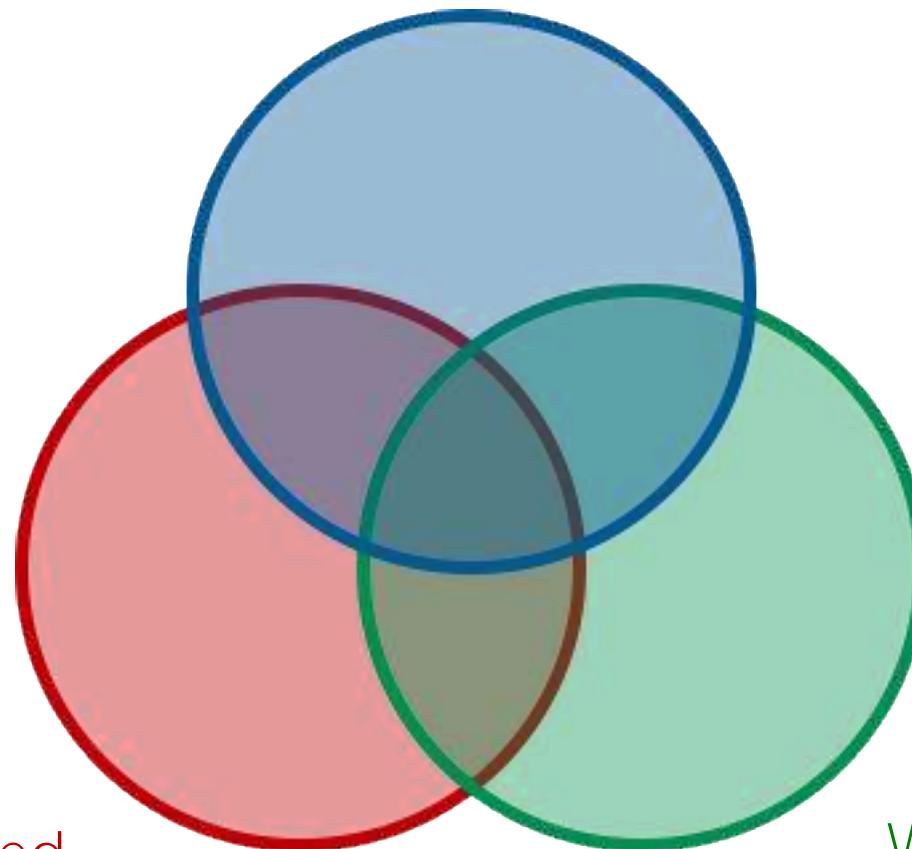




Work-as-Disclosed
Work-as-Observed
Work-as-Simulated
Work-as-Analysed
Work-as-Measured
Work-as-Judged

Work-as-Imagined

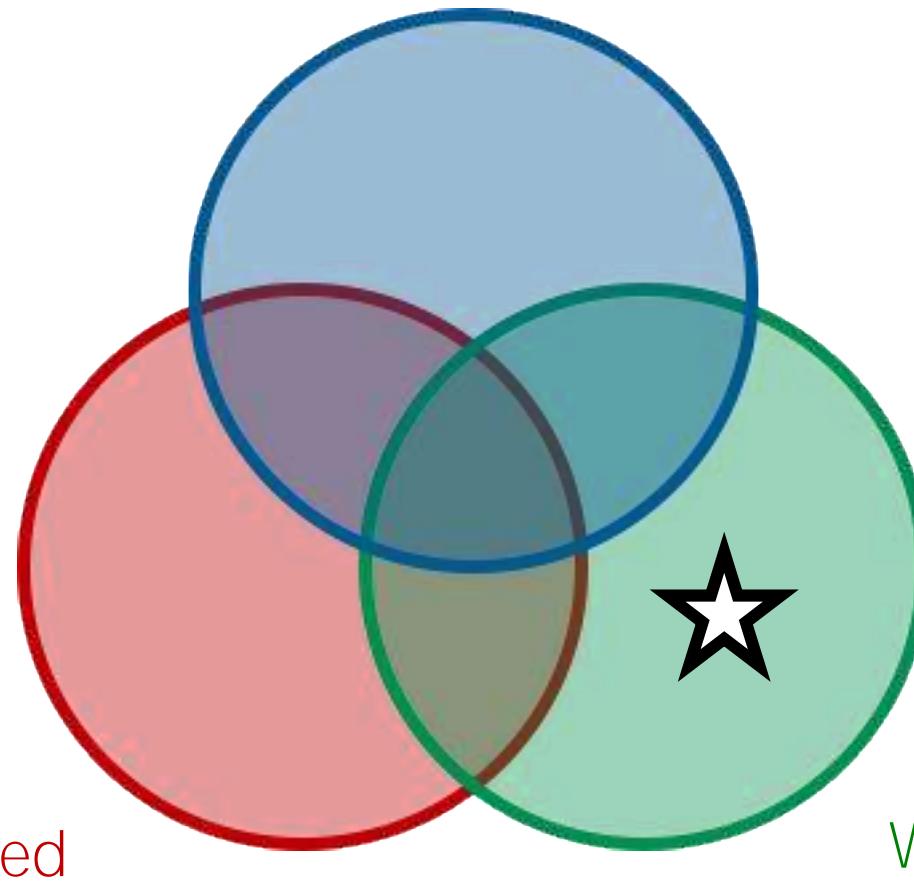
Work-as-Done



THE ARCHETYPES OF HUMAN WORK



Work-as-Done

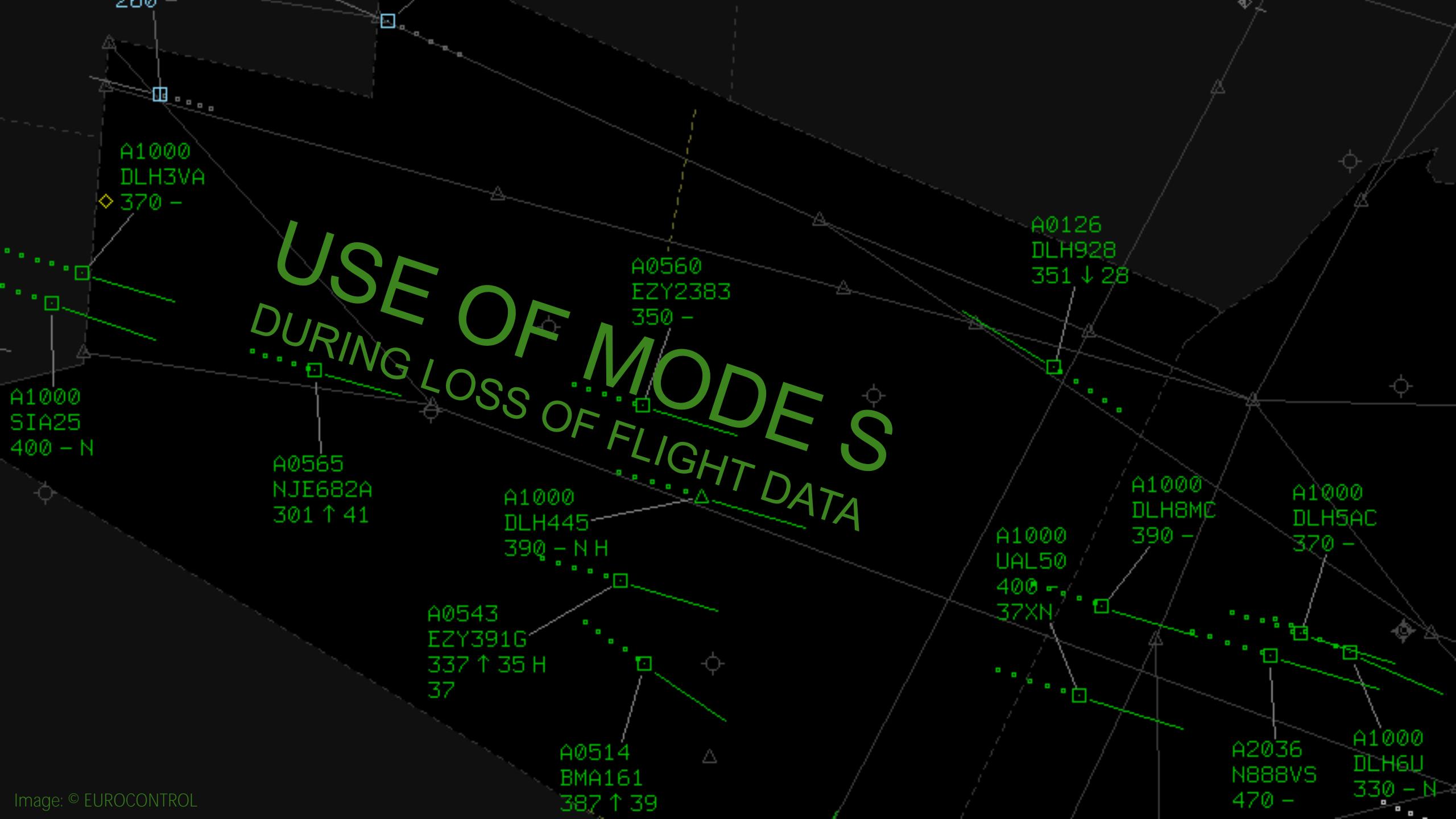


The Messy Reality
Work-as-Prescribed

Work-as-Imagined

“ Tell me about a situation where **work-as-done** is not **as-prescribed** and
usually not **as-imagined** by others ”

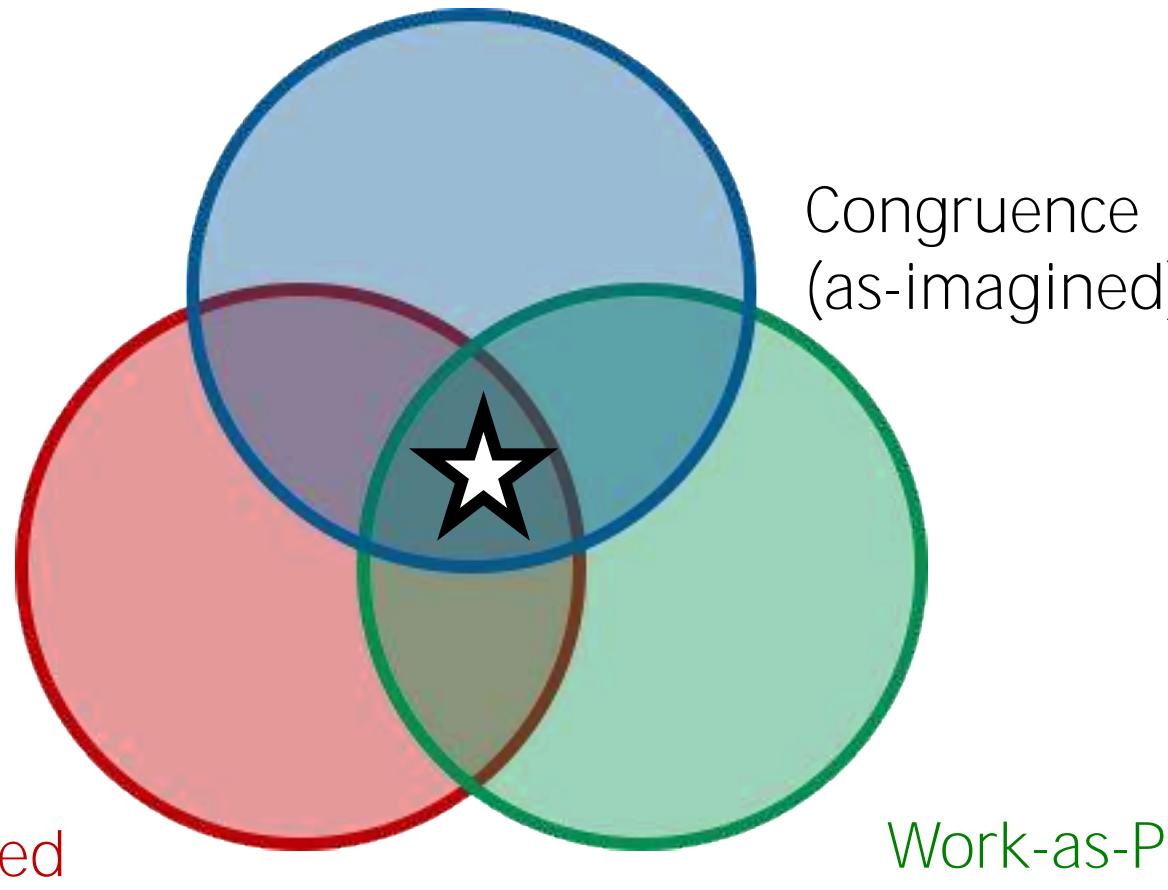
USE OF MODE S DURING LOSS OF FLIGHT DATA



USE OF RADAR WITHOUT A LICENCE

Image: © EUROCONTROL

Work-as-Done



Work-as-Imagined

Work-as-Prescribed

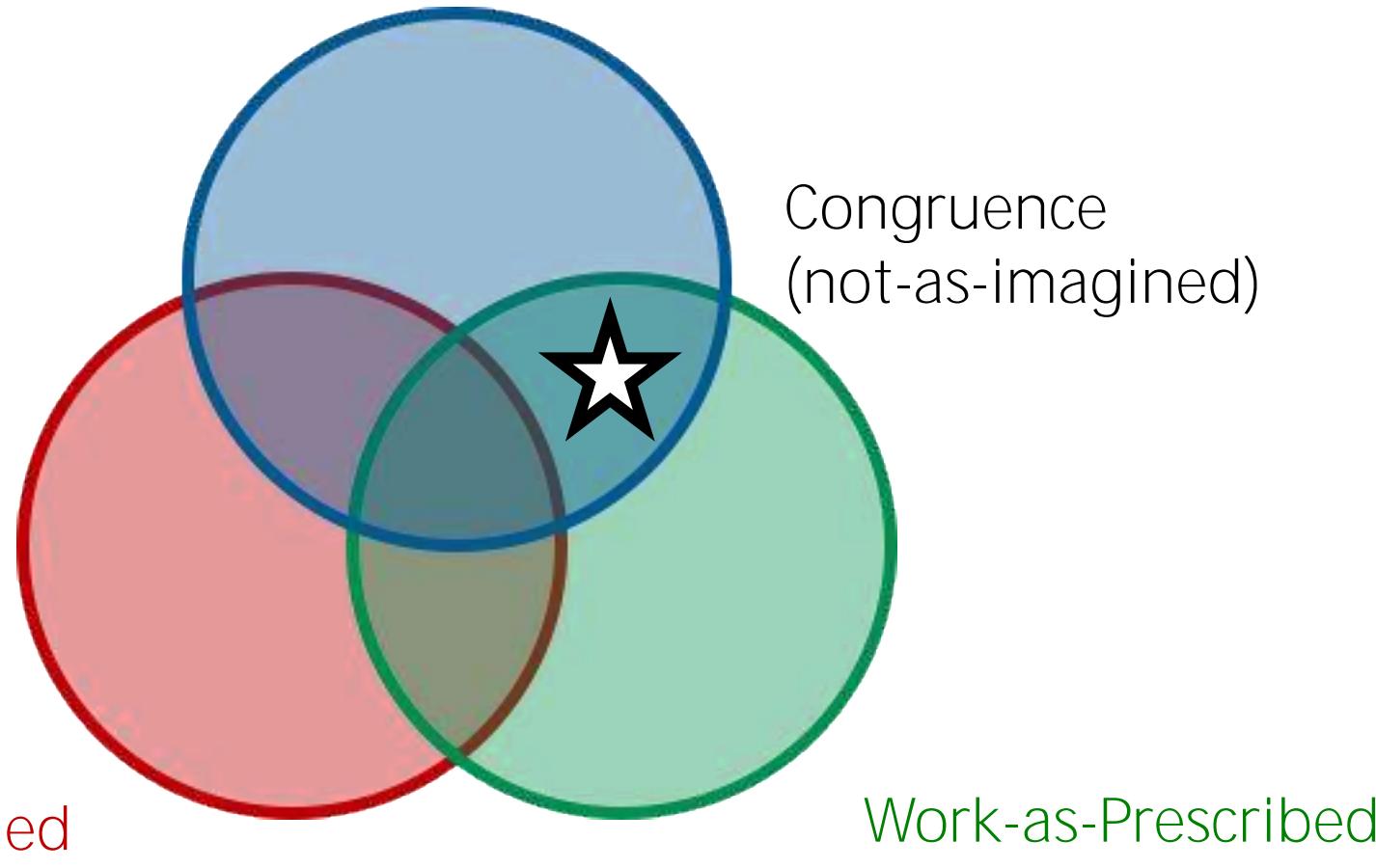
“ Tell me about a situation where **work-as-done** is **as-prescribed** and **as-imagined** by others.

”

STANDARD OPERATING PROCEDURES



Work-as-Done



Work-as-Prescribed

Work-as-Imagined

Congruence
(not-as-imagined)

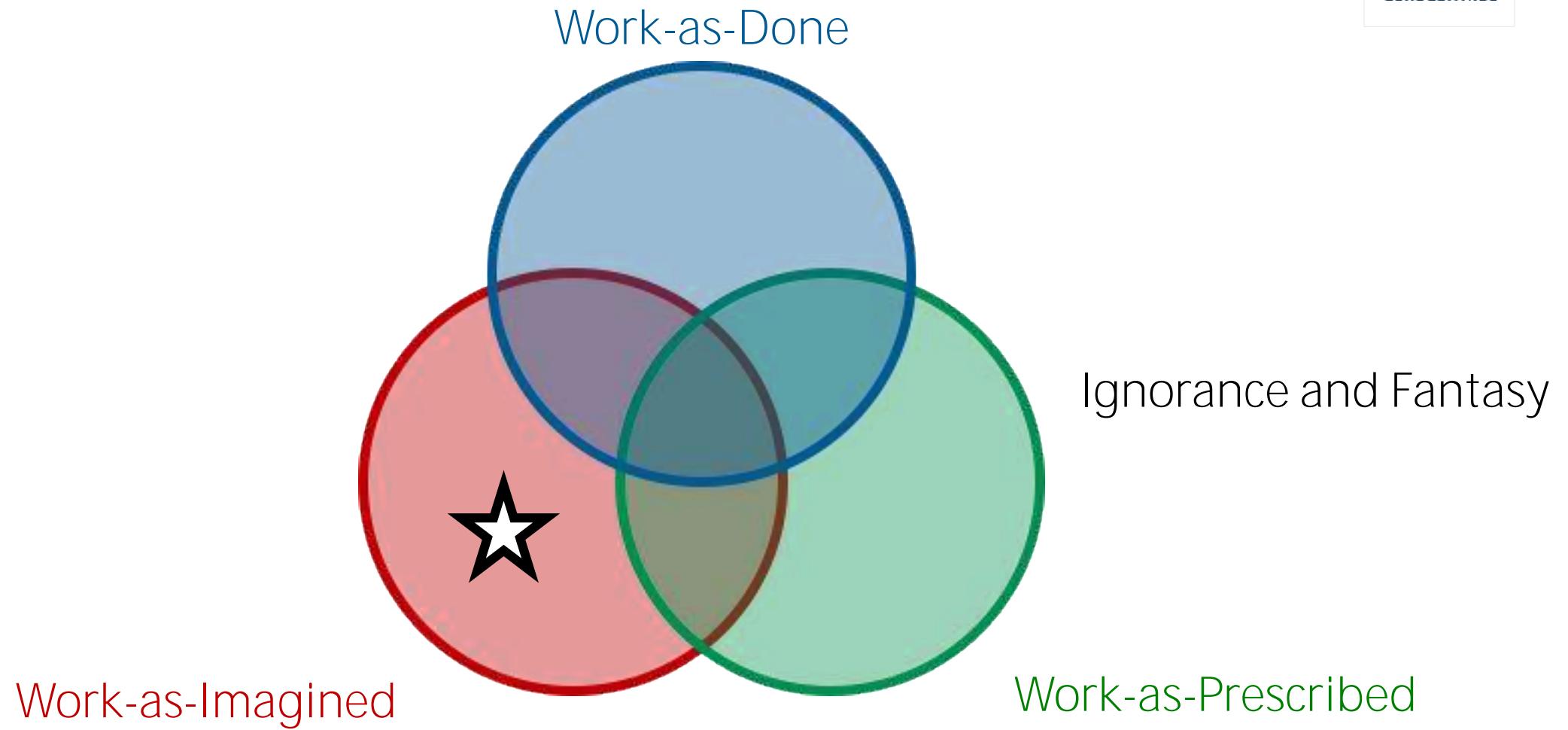
“ Tell me about a situation where **work-as-done** is
as-prescribed but **not as-imagined** by others.



STANDARD
PRESSURE
SETTING

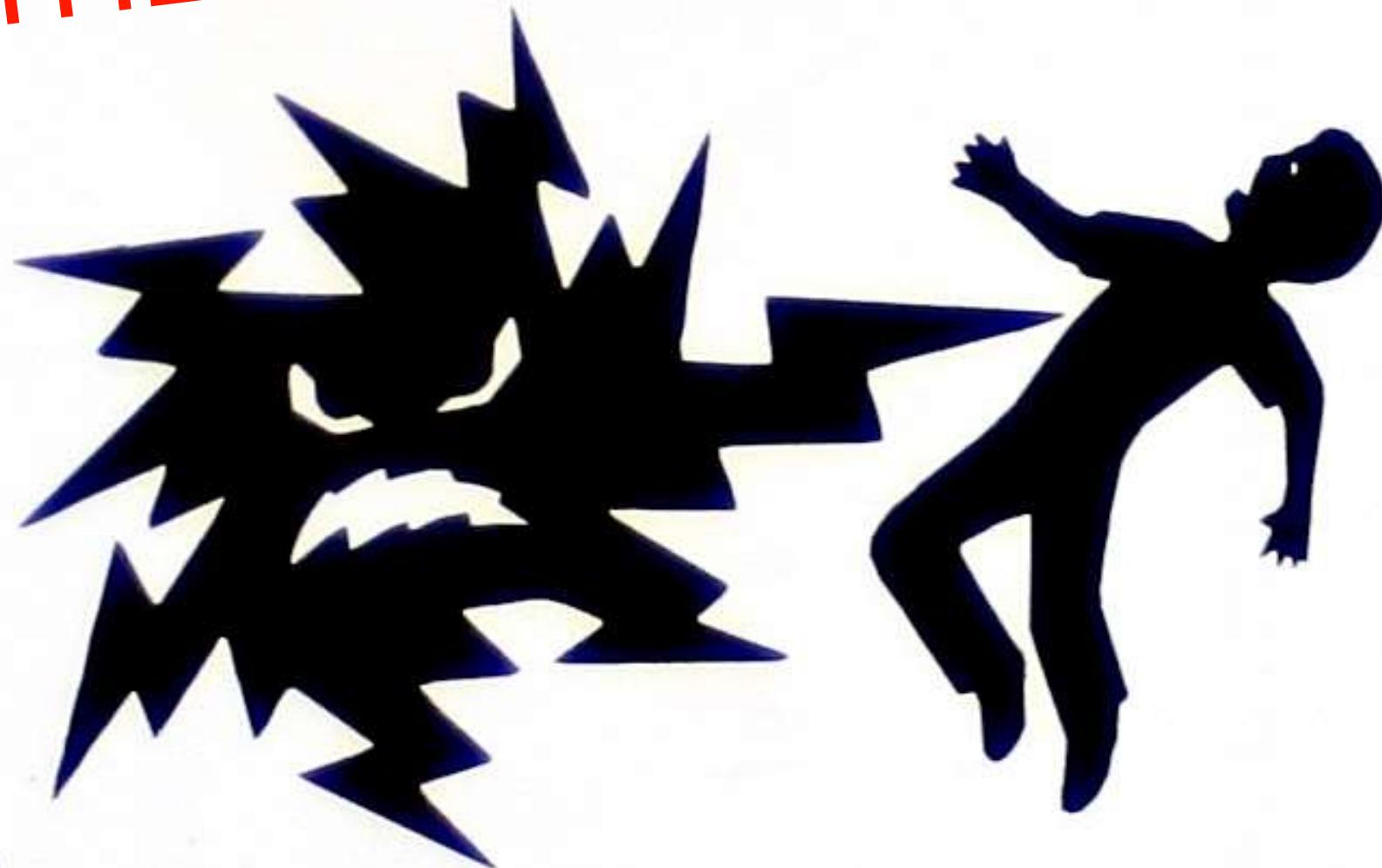
TRIPLE
DOUBLE
SHIFTING





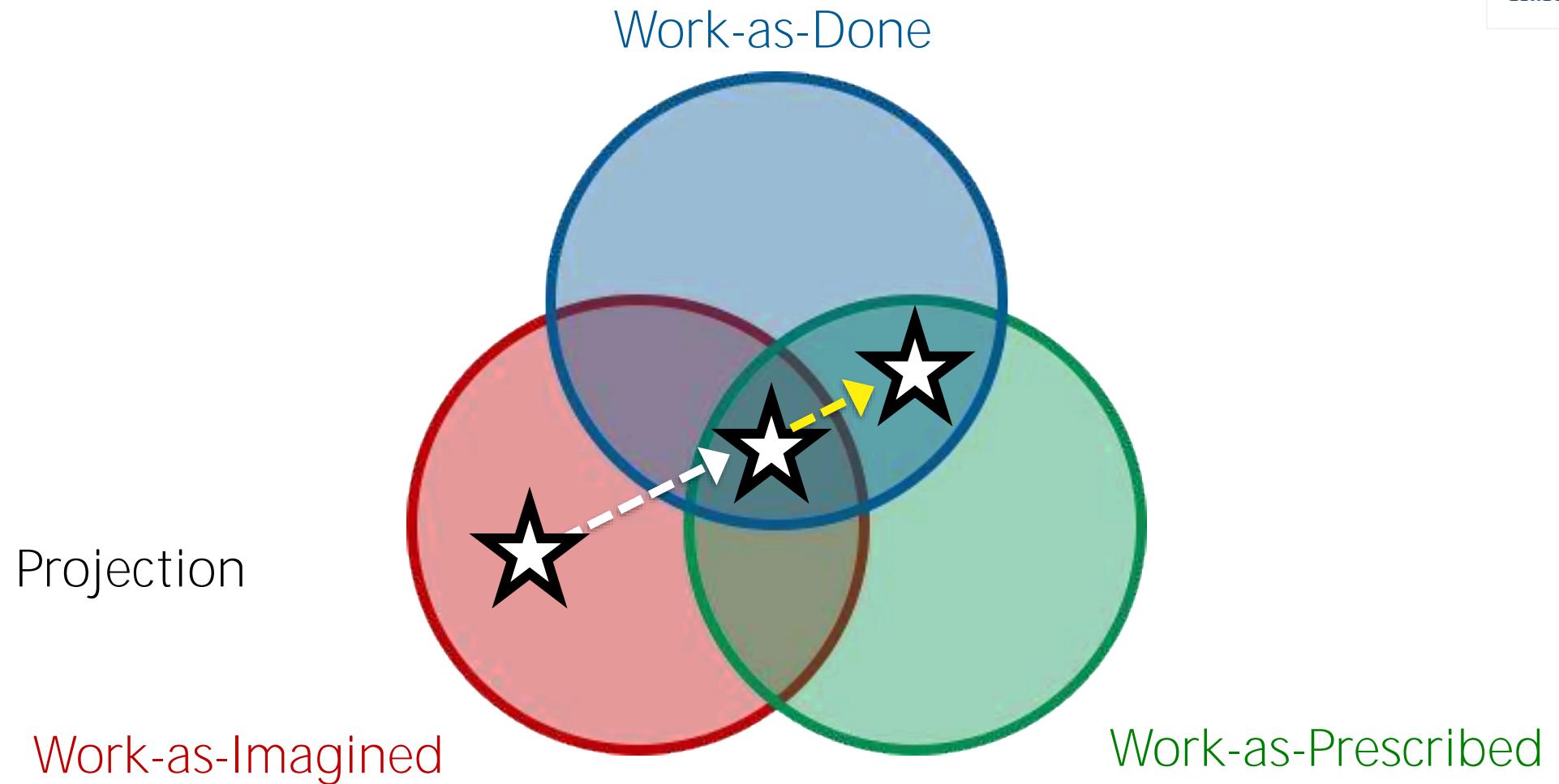
“ Tell me about a situation where current **work-as-imagined** is not **as-done** ”

THE LIGHTING CIRCUIT

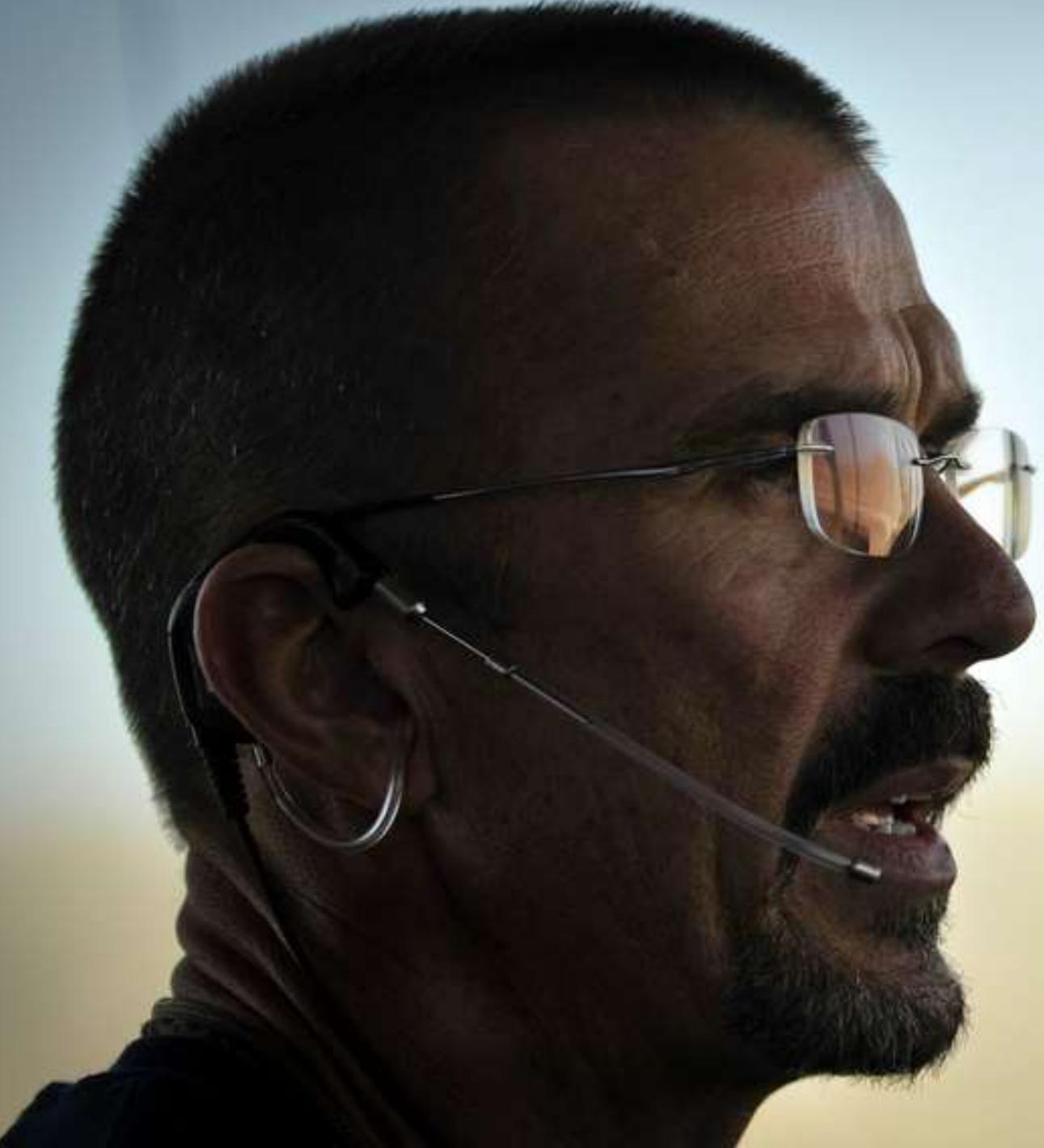


Hazardous voltage inside.
Can shock, burn
or cause death.

Keep out.
If open or unlocated
immediately call
the power

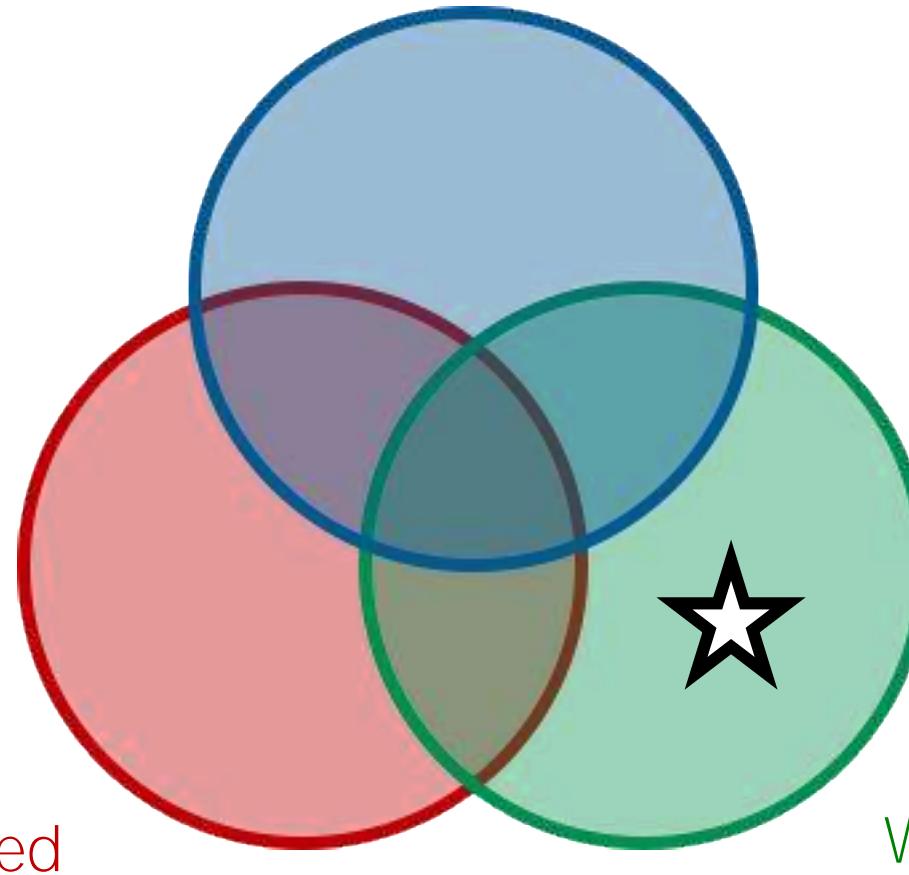


“ Tell me about a situation where **work-as-imagined** was projected into the future. It may or may not be as-done ”



AFTER
THE RUNWAY INCURSION

Work-as-Done



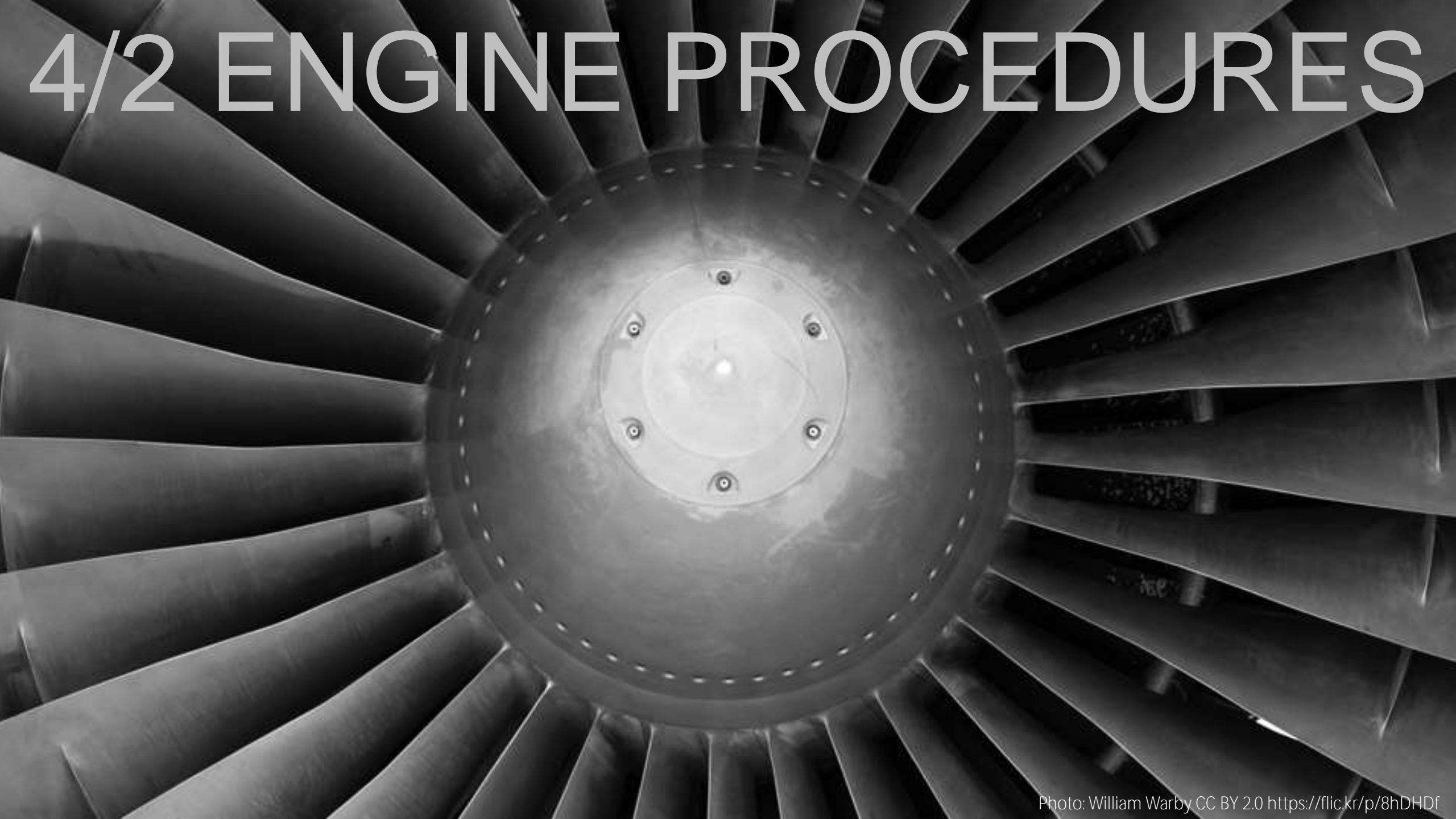
Work-as-Imagined

Defunct

Work-as-Prescribed

“ Tell me about a situation where **work-as-prescribed** is not **as-done** ”

4/2 ENGINE PROCEDURES

A high-contrast, black and white close-up photograph of a jet engine's front section. The image shows the large, multi-stage fan at the front, with its blades arranged in a circular pattern. Behind the fan, the engine's core structure is visible, featuring a series of concentric, ribbed metal components. A prominent circular access panel with several rivets is centered in the image, showing some internal structure. The lighting highlights the metallic textures and the complex engineering of the aircraft engine.



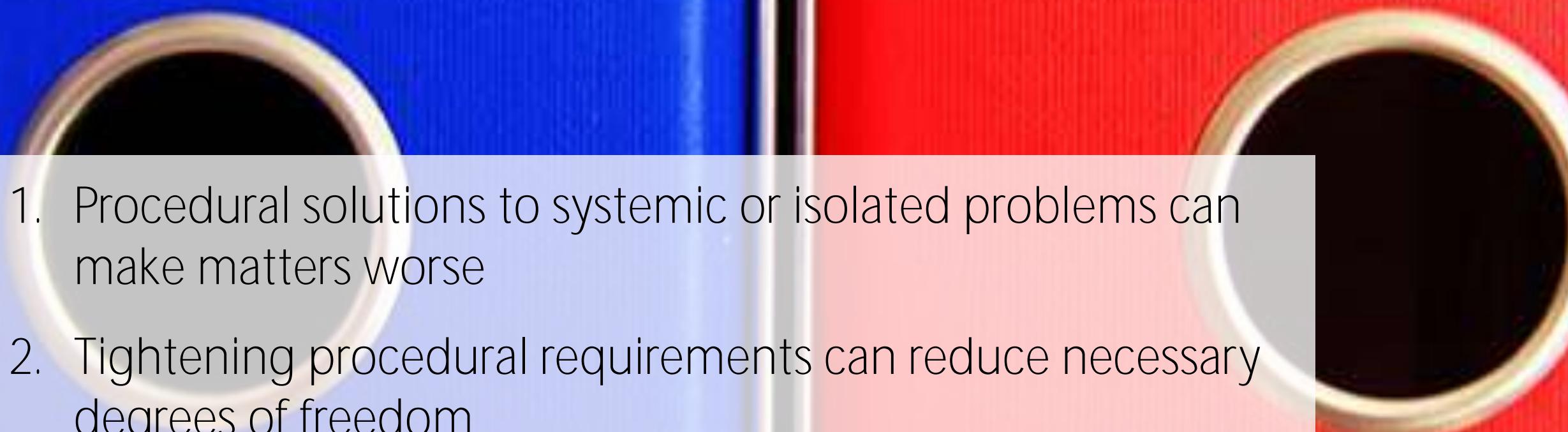
I, M₃, A₁, G₂, N₁, E₁



UNDERSTANDING

1. Psychological safety must be cultivated to really understand work-as-done
2. Work must be understood in terms of local rationality - why the things we do make sense at the time
3. Protection is required for the goodwill use of creative expertise – policy, principles and philosophy

INTERVENTION



1. Procedural solutions to systemic or isolated problems can make matters worse
2. Tightening procedural requirements can reduce necessary degrees of freedom
3. Human-centred design and systems methods are needed for procedure design

DESIGNING FOR WORK-AS-DONE

1. Understand work-as-done (WAD)
2. Collaborate on work-as-imagined (WAI)
3. Co-design prototype work-as-prescribed (WAP)
4. Implement in work-as-done
5. Test WAI and WAP against WAD
6. Repeat above until WAI-WAP-WAD gap acceptable
7. Monitor WAI-WAP-WAD gap

MIND THE GAP

HindSight25



WORK-AS-IMAGINED & WORK-AS-DONE

MALICIOUS COMPLIANCE
by Sidney Dekker

CAN WE EVER IMAGINE
HOW WORK IS DONE?
by Erik Hollnagel

SAFETY IS IN THE EYE OF THE BEHOLDER
by Florence-Marie Jegoux,
Ludovic Mieusset and Sébastien Follet

I WOULDN'T HAVE DONE WHAT THEY DID
by Martin Bromiley

Summer 2017

HindSight26

SAFETY AT THE INTERFACES: COLLABORATION AT WORK



HindSight28

CHANGE CHANGING TO ADAPT AND ADAPTING TO CHANGE



HindSight27

COMPETENCY AND EXPERTISE



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