**Deviant airline pilots: why we need them.**

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**Abstract**

The dominant approach to risk management views human deviance as inherently dangerous and thus revolves around questions how to prevent the 'normalisation' of deviance and manage compliance with rules and regulations. Based on a qualitative, in-depth study of commercial airline pilots' real-time risk management, we suggest that, instead, deviance plays an important and positive role in the human contribution to risk management. Pilots routinely deviate from procedures, and rather than seeing that as a problem, we point out how this enables them to manage risks real-time. Deviations trigger reflexive learning experiences that can be stifled by regulatory regimes guided by a negative risk discourse. We argue for a discursive shift towards the question how operators of complex technologies can be facilitated in their performance of complex judgments and professional discretion while they manage risk as they emerge real-time in the operation.

**Keywords**

*Risk Management, Deviance, Routines, Aviation, High Reliability Organizations*

## Introduction

*It is a routine afternoon departure for the flight crew flying to Berlin. The nagging competition between low-cost airlines puts quite some time pressure on the pilots. "It's like top-class sport," says the co-pilot. While the captain performs the pre-flight procedure by heart, he manages to cram in a few words to the observer seated on the jump seat behind the two pilots. "I can already tell you…" (his hands*

*whizzes across four different levers and switches) "…that I'm not following normal procedure here." The Aircraft Operating Manual confirms this statement, showing a slightly different sequence of checking and switching the position of 85 controls and indicators, a procedure that the captain performs in only a few minutes. On being asked why he deviates from the normal procedure, the captain later explains that this is how he had once learned to do it, when he was still a co-pilot. This sequence makes sense to him. It ensures him that he is more aware and in control of the plane's systems than if he would exactly follow the normal procedure as it is prescribed in the manual.*
*(Observation and post-flight interview, September 2015)*

Is it normal to routinely deviate from formal procedures in an industry known for its safety and reliability? Indeed, deviance is seen as a potential hazard in the context of risk and safety management (Hale & Borys, 2013). Normalisation of deviance is regarded as a cause for accidents, rather than a contribution to safety (Vaughan, 1997). The dominant view is that if deviance is normalised, an accident cannot be far away, so deviance should be controlled top-down (Hale & Borys, 2013). Consequently, risk management systems are developed and refined, which identify risks inherent to an organization's activities, formulate mitigating measures, and assure that organizational members comply with these measures (Power, 2008). This leads to an intensification of control (Power, 2008), involving methods like reporting, auditing, enforcing compliance, and adjusting the rules based on systematic analyses of hazards (Power, 1997; Reason, 1997).

However, deviance is generally accepted as part of accomplishing normal work processes in the literature on organizational routines, ever since scholars pointed out how performative routines deviate from ostensive routines (Feldman & Pentland, 2003). Ostensive routines represent the work as it is imagined, often based on formal procedures, which create some inertia and predictability in an organization (Hannan & Freeman, 1983; March & Simon, 1958). Recently researchers argue that routines also carry within them the potential for variation and adaptation, which emerges in performative routines (Feldman & Pentland, 2003).

In light of these advances in the routine literature, we reflect on the risk management literature, which in general concerns itself more with the ostensive work routines, or the risk management systems as they are imagined, than how risk

management is performed real-time in the operation (Maguire & Hardy, 2013). This literature consequently tends to disregard an important part of the complex judgements and professional discretion that are part of real-time risk management practice. To address this problem we present a study of the work of airline pilots to argue that real-time risk management requires routine deviation from formal rules and procedures. Pilots are authorised and trained to manage risks as they emerge real-time in the operation, but they can also be held accountable by the standards of formal risk management systems. Their work thus presents a valuable case of the tension between ostensive and performative routines in a highly standardised, risk-managed setting. To find out how pilots deal with this tension, and manage risks real-time during flight operations, we pose the following research question: *how do airline pilots perform real-time risk management during regular flight operations?*

**Theory**

Systematic risk management has become increasingly prevalent in late-modern societies (Beck, 1992). Risk management is being applied to virtually all inherently dangerous human activities, ranging from flying planes (ICAO, 2013), to driving cars (Elvik, Vaa, Erke & Sorensen, 2009), providing medical care (Cagliano, Grimaldi & Rafele, 2011), and mountaineering (Kayes, 2006). The approach is also applied to more and more mundane, less hazardous activities (Power, 2008) such as going to school (Binkhorst & Kingma, 2012). Risk management systems are thus becoming increasingly pervasive and control many aspects of our daily lives (Beck, 1992; Wildawsky, 1988).

The proliferation of risk management systems has been explained by the existence of successive societal crises of control, aroused by public drama following aircraft crashes and other traumatic and publically debated accidents (Turner & Pidgeon, 1997). Such public dramas incite the periodic renewal of an interest to hold actors accountable for safety, and create convincing enough accounts about what went wrong (Dekker, 2004). The consequence of successive crises of control is that in time they lead to a bureaucratisation of risk management (Dekker, 2014).

Bureaucratisation of risk management often results in a rising emphasis on compliance with rules and procedures (Dekker, 2014). Increasingly, organizations are held responsible for auditing their own practices and keeping them in line with certified procedures, a phenomenon that Power (1997) calls the ‘audit society’. In

aviation, an example is Line Oriented Safety Audits (LOSA), where pilot observers fly along with their colleagues in operational flights and identify threats based on observed deviations (Klinect, Murray, Merritt & Helmreich, 2003). The result is that risk management systems are constructed that have a predominant focus on developing formal procedures and checklists, and use audits to check compliance with the rules, which creates a deepening worry about deviance (Hale & Borys, 2013).

In contrast, the debate on *high reliability organizations* (HROs) emphasises a different approach to risk management (LaPorte & Consolini, 1991; Weick & Roberts, 1993). Operating safely with complex and inherently hazardous technologies requires actors to have a 'preoccupation with failure', a 'reluctance to simplify' and a 'sensitivity to operations' (Weick & Sutcliffe, 2007). This enables actors to notice problems early and act upon weak cues to avoid catastrophes. These practices form part of an organizational *safety culture* that encourages members to anticipate and adapt to disturbances that happen real-time (Weick, 1987; Reason, 1998; Weick & Sutcliffe, 2007). Safety cultures signify a supportive social context to operate mindfully of the subtle disturbances that may require them to deviate from their normal role (Weick, 1983; Weick & Roberts, 1993). Members of HROs are socialised into safety cultures by intensive, continuous training and they are involved in continuous redesign of systems (Roberts, 1990).

The contrast between the audit society and HRO debates signifies a pervasive tension in approaches to risk management. While in the audit society emphasis is put on 'controlling' deviant behaviour by implementing sophisticated risk management systems, in the HRO debate the attitude towards reliable operations hinges on increasing professional discretion for identifying weak cues to prevent catastrophes. In the airline industry, both compliance and professional discretion are strongly embedded in flight operations (Haavik, Kongsvik, Bye, Røyrvik & Almklov, 2017). This raises the question how pilots deal with both competing demands during real-time risk management in flight operations.

## Methods

The methodological strategy for data collection followed a logic of zooming in and out of the phenomenon of interest (cf. Nicolini, 2009). We gathered qualitative data about pilots' real-time risk management in the Netherlands between 2011 and 2016

using a variety of methods, ranging from interviews to in-flight observations. In addition, investigating industry stakeholders and participating in professional networks provided opportunities for triangulation as well as a context in which to understand pilots' accounts and observed behaviour. Since interactions on the ground emerged as a relatively understudied and important operational risk, we also conducted two years of research on the platform of Amsterdam Schiphol airport. Table 1 provides an overview of our data sources for this study.

| **Data source** | **Quantity** |
|---|---|
| In-depth interviews with pilots (1-4 hours) | 9 interviews, 19 hours total |
| Observations in jump seat | 4 flights, 8 hours total |
| Aircraft operating procedure manuals | 2 manuals |
| Interviews aviation stakeholders | 21 interviews |
| Participation in professional networks | 9 seminar meetings |
| Accident reports | 3 reports |
| Interviews with ground service personnel | 14 interviews |
| Observations ground personnel on platform | 16 observations |

*Table 1. Data collection*

Towards the end of the data collection we began categorising stories from our field notes and from interview transcripts about deviance. We focussed on routine settings rather than accidents in order to prevent the frequent mistake in risk management to 'select on the dependent variable' with 'hindsight bias' (Dekker, 2004). We then used the last series of interviews and observations to refine the categories and their underlying logic.

## Findings

Table 2 describes how pilots perform risk management, with a selection of situations that illustrate how deviations are normal in each aspect of regular flight operations. The categories marked (I) illustrate how normal operational conditions necessitate pilots to deviate, and (II) in what ways deviations trigger reflexive learning

experiences that enhance real-time risk management. The categories (I) thus emphasise how pilots, responding to risks as they emerge, reflect in-action, and illustrate how this reflection gets institutionalised. The categories (II) emphasise how pilots also reflect on actions and thus foresee the need to deviate from an intended plan real-time, in particular scenarios, or as a more general principle.

| | **Flight Routine Phases** of a regular short-haul flight | | | | | |
|---|---|---|---|---|---|---|
| **Risk Management Aspects** that surface in routine operational improvisations | | *Preparation and start-up* | *Taxi and take-off* | *Climb, cruise & descent* | *Approach and landing* | *Docking and turnaround* |
| | *I) Handling disruptions* | | | | Co-pilot resists captain's creative, non-standard instruction to operate the radio in combination with handling a small system failure, but is persuaded by the captain who is busy landing. | |
| | *I) Handling pressures* | | | | | Working through paperwork to make sure if it is safe and legally allowed for an airplane with a fuel leak, discovered after landing, to make a return flight to the home station after getting repaired by mechanics at the out-station, and thus prevent further delays. |
| | *I) Institution-alised work-arounds* | According to widely used 'flex take-off' procedure, entering a higher outside air temperature than actually present to 'fool the computer' so it will command lower take-off power and thus save engine life. | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | *II) Anticipating discrepancies* | | Scanning the ground radio frequency and visual cues to foresee crossing paths with another aircraft approaching the same taxiway intersection and get ready to brake despite air traffic control instructions | | | |
| | *II) Internalising and activating triggers* | | | Purposefully getting triggered by the item on the after take-off checklist, which prescribes to check the setting of cabin atmosphere controls, to also keep monitoring if the cabin pressure indications actually behave as expected during climb. | | |
| | *II) Talking about deviant practices* | | | | Reflecting on the values of rule-following vs improvising amongst pilots, a captain shares a 'war story' about handling a failure during landing in a non-standard way and having to convince the co-pilot to deviate. | |

*Table 2. Examples of real-time risk management during regular pilot flight operations*[1]

## Discussion

Current risk management debates are dominated by a negative view on deviance, which contradicts our finding that deviance is omnipresent during every phase of

[1] To keep with the word limit, and to allow for further analysis, Table 2 will be expanded in the full paper version.

regular flight operations. As Dekker (2004) argues, a potential explanation could lie in the hindsight bias of accident investigations. Indeed, most seminal risk management literature is predominantly based on accident analyses, which seek to explain the (root)cause of accidents by looking back and identifying abnormalities in the chain of events (Reason, 1997). Although insightful, these studies allowed for the continuation of a negative risk discourse, perpetuated by influential concepts such as Vaughan's study on (1997) normalisation of deviance, or Snook's (2002) study on practical drift.

Instead, our work highlights that risk management activities are normally deviant. In regular settings deviance triggers reflexive learning experiences (Schön, 1983). Similarly, our findings indicate that deviance appears in two ways. Deviance can be a reflection-in-action when handling disruptions, external pressures, and institutionalised workarounds. Deviance can be reflection-on-action when it provides cognitive feedback, something to talk about, and helps to construct projections about future risks.

Deviance is accepted in organizational routines (Feldman & Pentland, 2003) but more difficult to explain in context of risk. In HROs, consequences of failure are high, so deviance appears particularly dangerous. Yet, viewing institutionalised workarounds as normalised danger, as Vaughan's (1997) work would suggest, could be complacent. Such a view perpetuates the idea that workarounds and deviance can be eliminated from the system and that zero risk is an achievable goal. In reality, HROs and their members need to constantly balance risks to be safe as well as efficient. This is achieved through engaging in complex discretionary judgements about how and why to adapt during real-time operations.

Our study thus opens up new possibilities for organizations experiencing risk bureaucratisation. Maguire and Hardy (2016) argue that it is almost impossible for organizations to resist the dominant risk discourse, which seeks to eliminate uncertainties that emerge with deviance. As an element of reflexive learning, however, deviance is reframed as a predominantly positive force in complex, high-tech operations. This discursive shift could contribute to productive and operator-empowering discussions about how to manage ambiguity and surprise real-time (Rankin, Woltjer & Field, 2016).

## Conclusion

Our study indicates that pilots routinely deviate from procedures in normal flight operations. This challenges our current understanding about normalisation of deviance as a potential hazard for safety. Instead, we argue that deviations trigger reflexive learning experiences that facilitate operators to make complex judgments and utilise professional discretion, while they manage risk as they emerge real-time in flight operations. With growing dependence on high-tech systems, a discursive shift is needed to support deviance as an essential element in managing these systems real-time.

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