



# Design Thinking for Aviation Safety

BY DR. BENJAMIN GOODHEART

**T**he safety industry sees its fair share of fad ideas come and go; and even today, there are scores of branded products that offer to solve aviation safety problems. Despite catchy names, a lot of today's so-called solutions to safety and risk management still focus on old ideas about the way the aviation industry works, and the role an organization plays in the work ecosystems within it. In practice, this often looks like an overemphasis on human error, on finding "root cause," and on reacting to negative outcomes.

Design thinking avoids this focus on backward-looking data and, instead, shifts to human behavior as a centerpiece for product and system development. Although design thinking has its own unique vocabulary, and the methods push a lot of us aviation folks out of our comfort zone, the science behind designer-like thinking is paying off in big ways in education, policy, organizational and process design, customer service delivery, and product development. Design thinking provides a way of focusing on employees' individual experiences and of creating processes that center on

workers. The result: more compelling solutions and tools that directly contribute to employee safety, satisfaction, productivity, and involvement.

## What is design thinking?

Design thinking emerged as a method for capturing capacities that might be overlooked by more conventional methods of problem solving. In the early 1990s, design was primarily focused on traditional applications like creating the first computer mouse or reinventing the toothbrush. As the team behind design thinking began

Continued on page 19

## Design Thinking for Aviation Safety

Continued from page 17

to branch out into problems like organizational restructuring or analyzing customer needs, they focused on experiences instead of product development. Experiences are inherently human, and so design thinking uses a system of overlapping spaces to provide a creative, human-centered process and human-centered outputs. Design thinking is defined in part by its protocol for identifying better ways of finding and understanding a problem and then moving quickly to test a variety of solutions. Often, the problems design thinking is best at helping solve are what designers call “wicked problems;” the kinds of issues that are tough to tackle because information is incomplete or contradictory, or because the requirements change. Thomas Lockwood, former president of the Design Management Institute, a non-profit whose mission is to demonstrate the strategic role design plays in business, offers a comprehensive definition of the concept as: “a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping, and concurrent business analysis.” Tim Brown, CEO of the design firm IDEO (widely considered to be the nexus of design thinking) describes the idea as “...a system that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business can convert into consumer value and market opportunity.”

Sound too ‘out there’ to have any application to aviation operations? Fair enough. Managing safety and risk purely based on intuition and creative impulses probably isn’t a terrific

idea. Over-reliance on analytical, rational metrics can be just as dangerous. Safety is not a singular outcome; it is a process. Human behavior, emotion, interaction with environment, and performance all figure prominently into any attempt to create safer, more resilient organizations. Here’s where thinking like a designer can turn ordinary safety tools on their heads to achieve better outcomes.

### How to think like a designer

In practice, it is useful to imagine design thinking as a three-step process, referring to the elements as steps is a bit misleading, given that users might move freely from one phase to another. On paper, design thinking involves inspiration, ideation, and implementation. Although the steps to thinking like a designer aren’t fixed in stone, inspiration is a natural beginning.

### Inspiration

Inspiration in the context of design thinking is less about a flash of brilliance, and more about the hard work of gaining empathy for the stakeholders for whom the process is intended. Empathy is the user-centered engine that makes design thinking work, and the kind of deep understanding required to gain empathy for an end user means that we have to break down barriers that separate work as it is intended, and work as it is actually performed. In a traditional design role, this means connecting with customers, but in the context of safety systems, it is more likely to indicate a need to focus introspectively by connecting with employees at every level. The inspiration phase is deeply

collaborative, and while issues of organizational design are often conveniently approached from a singular perspective (think management), co-creating solutions according to user needs can help avoid the struggle of trying to make a one-dimensional solution fit where it doesn’t. Often, we tend toward assumptions about the beliefs and values of the people we work with, and we don’t question in depth the motivations and emotions that people bring to work. Empathy, the intended outcome of this phase of the design thinking process, provides us a pathway to understanding those deep insights, but it requires that we participate directly with people in meaningful observation and engagement. This phase directly affects safety and communication by reducing the gap in understanding how work is actually done, as opposed to how we imagine it gets done. Doing that successfully means there is less likelihood that policies and procedures—as a result of unintended design conflicts—create the need for users to invent a work-around or circumvent a rule altogether.

### Ideation

In product design, ideation involves rapid, free-form prototyping, and volume is key. In an organizational sense, prototypes take on a different meaning, but the central ideas remain similar. Ideation is our opportunity to transition from understanding the problem from a user perspective to identifying potential solutions. Experienced design thinkers sometimes describe the process as

Continued on page 21

## Design Thinking for Aviation Safety

Continued from page 19

‘going wide’ to develop a lot of material to filter through, rather than one refined idea. Ideation thrives on the ability to defer judgment as designers sketch, mind-map, and collaborate toward the generation of ideas. For many in aviation, focusing on creativity while tabling our rational minds is a tough sell. By extension, we aren’t always used to experimenting as a method of delivering more intuitive and appropriate organizational controls. However, moving beyond obvious solutions to address the “wicked problems” that continue to persist in organizational safety and systems design requires that we provide a mechanism for getting those obvious answers out of the way and giving our imagination and creativity a voice. The design process isn’t about ignoring careful examination of ideas. In the ideation stage, we simply want quantity, diversity, and collaboration.

### Implementation

Implementing ideas can be separated into prototyping and testing regarding product development; but, if creating organizational change is the goal, then things look slightly different. When policies or procedures are designed, there’s often a lot of pressure to make sure things are perfect on the first go-round. But, design thinking is about changing the way we think, remember? One of the common mantras of designers is: Build to think. Test to learn. With that in mind, there is no reason why several, small-scale changes cannot be applied to the way we work, so the design team can evaluate ideas in real time and make more informed choices. In many industries, despite

a stated interest in gathering ideas to improve organizational processes, many of those ideas are squashed by the weight of bureaucracy demanding that any idea be vetted by management, and then only after it has been submitted according to a template, and by the proper reporting channels. Instead of creating roadblocks to idea testing, the implementation (sometimes called iteration) phase of design thinking is focused on prototyping for incremental improvement of the experience for end users. For traditional designers, this phase is all about showing, not telling, even if the final direction is still a bit unclear. That means users have a chance to interact with early prototypes, provide valuable feedback, and then drive the rapid progression toward a solution that meets their particular needs. It may be useful in this phase to think about proto-experiences, rather than prototypes, given that the focus is on organizational design. Designers can spend almost as much time thinking about how a design can be best evaluated as they do on the design, because priming the experience to create the best opportunities for feedback is important to the user-centered philosophy. For organizational design, the process may not move as quickly, but many opportunities for testing implementation of new processes, procedures, or ideas still exist. Whether seeking an improved product or a process, it is important that designers don’t fall in love with their prototypes. Keep in mind that rapid prototyping and testing is part of the innovation process, so a lot of “first” attempts will end up on the cutting room floor.

### Design thinking for safety

Design thinking provides systems-level solutions to systems-based problems. Because of that distinction, expecting that design thinking is a methodology – like Six Sigma or Total Quality Management – that can be applied rather than integrated is setting yourself up for disappointment. Design thinking, as the name suggests, is a shift in the way designers create knowledge and solutions. Just as implementing safety management systems continues to require a few radical thought changes, design thinking inspires by throwing our old systems off balance. Design thinking addresses one of the primary reasons many firms struggle mightily with implementing safety management systems that actually work: systems are designed for work as managers think it is done, and not with the end user’s needs in mind. Let’s explore some examples of how design thinking might be used for improving organizational safety.

#### Example 1

Imagine we’d like to plan and implement a safety reporting system within a maintenance department. Traditionally, senior managers might simply identify budget constraints before adapting an existing idea from a similar organization (like borrowing another company’s forms and replacing the logos), placing some reporting forms near a safety bulletin board, and then telling the maintenance team to submit reports. A year later, we’ll all discuss why reports aren’t being filed, and we might

Continued on page 23

## Design Thinking for Aviation Safety

Continued from page 21

convene a small committee to talk through the problem, make recommendations, and repeat the process.

Using design thinking as a template for the way we approach the reporting program, the process might look more like:

- Form an understanding of what users (employees) need and want from a reporting program by focusing on stories and empathetic interviews of front-line users of the process. We might ask a mechanic to tell us about a day when they felt frustrated, and a day when things went really well. We would ask “why” often so that we can continue to explore the things that affect that person’s response to work. We might identify a time when management really “got it” and a time when they didn’t, from the mechanic’s perspective, and how that looks and feels. We would aggregate ideas from many stakeholders to better understand their work experience.
- Shadow employees through their day by dressing like them, talking like them, working with them, eating with them, and engaging in conversation.
- Ask front-line employees to design the process; then co-create that process after learning about their experience empathetically. Discuss the differences in the designs, and how the process of being the design recipient changed the resulting ideas.
- Create several possible solutions with a bias toward action, asking ourselves ‘and then’ instead of examining why an idea

can’t or won’t work. We might identify some far-out solutions, like a button that records an audio hazard report and enters it into the system, or a machine that knows when information from previous reports is about to be useful, and reads the information just before it is needed. We would focus on ideas quickly, with emphasis on generation, not evaluation.

- Rapidly prototype ideas, even the wild ones, address the issues identified in the empathy phase for iterative improvement toward a user-centered solution. Because some of the ideas are a little far-fetched, we might narrow them into categories of the most rational, the most unexpected, and the most likely to excite the user.
- Place ideas back in the user’s control, allow them to test ideas, and solicit feedback.

### Example 2

Our fictional company is looking to add more structure to our internal event investigations. We’ve identified a line supervisor with an interest in safety, and sent her to a course that included topics in root cause analysis. We’re spending a lot of time reviewing incidents and accidents in the company safety committee, but event rates don’t seem to be dropping. Management is considering some additional investigation training in a classification system like the Human Factors Analysis and Classification System (HFACS), and the part-time safety manager is growing more frustrated.

If we were to address the issue of investigations through design thinking, the process may go more like:

- Work with front-line employees to determine the things that make them successful in their roles, and investigate what creates their roadblocks. Have employees “walk us through” a perfect shift, asking questions about specific processes they use to accomplish work safely. Discuss how information from investigations is communicated to them.
- Work alongside the part-time safety manager during an ordinary investigation to understand their perceptions of the role and expectations of how they interact with managers and line personnel. Ask what barriers prevent them from more effectively learning how to achieve improved safety outcomes. Question why they think those barriers exist, and whether they serve alternative purposes.
- Brainstorm with a group about ideas to enable better investigations. We might arrive at an idea for conducting investigations of things that go perfectly right, instead of only trying to learn from things going wrong.
- Prototype several ideas of what an audit of normal operations looks like. Perhaps we would focus on trying to extract ideas from employees doing the work we’re interested in investigating to find better resources or processes to support them, and

Continued on page 25

## Design Thinking for Aviation Safety

Continued from page 23

identify what might happen when those resources or processes are not readily available.

- Interactively improve the normal operations investigation to identify and track metrics that help determine success in operations, and incorporate those into our management tools as well as into training.
- Follow up with front-line employees to evaluate how effective the investigations are at identifying and communicating the things that are working well, and return to the ideation phase or modify prototypes as necessary to address user needs.

### Five steps to designing safety

These examples are far from the only applications of design thinking, but they represent some basic challenges that most of us in the aviation industry face, and give some concrete examples of what incorporating design thinking might look like. Even though designer-like thinking is a paradigm shift, it doesn't have to be applied to every situation. The best way to approach changing your thinking is to start by realizing that you can tightly control operational

variations, or you can provide opportunities for innovation, but you cannot do both. Choose those activities or operations where you can afford a little latitude and you might find the approach increases the effectiveness of those areas. Here are some things you can do right now to help incorporate design thinking strategy into your organization:

- Identify “wicked problems.”
- Remove strict control—even if just temporarily—to allow more freedom for innovation.
- Be purposeful about seeking an empathetic perspective. Ask users, “why” and listen to their emotional responses to the question.
- Iterate. Safety relies on continuous improvement, and design thinking can be a great incubator.
- Look at design thinking as a fundamental shift, one that drives better alignment of employees, allows us to think predictively, and creates opportunities for creativity.

With these practical tools, designing for safety is something all of us can use to infuse safety management with a user-centered focus and

a spirit for innovation. Most of all, thinking like a designer can help to remind us that systems, whether for managing safety or otherwise, are reliant on humans for design and purpose. Keeping humans at the center of systems design ensures that we work and communicate more effectively, with greater employee engagement, and with a better understanding of what creates safety. **A**

Dr. Benjamin Goodheart manages aviation claims and safety strategies for AirSure Limited, the country's largest general aviation insurance broker, with offices in Golden, CO and Plano, TX. Benjamin has extensive experience in aviation safety management, planning, and accident investigation. He is an ATP-rated pilot and flight instructor, and he holds a Ph.D. with a research focus on general aviation safety. To learn more about how AirSure can help you manage risk, call 303-526-5300 or visit AirSure Limited on the web at [airsure.com](http://airsure.com).

