

Pathways to Human-Centered Operating Principles

ALPA HF Symposium
May 31, 2018

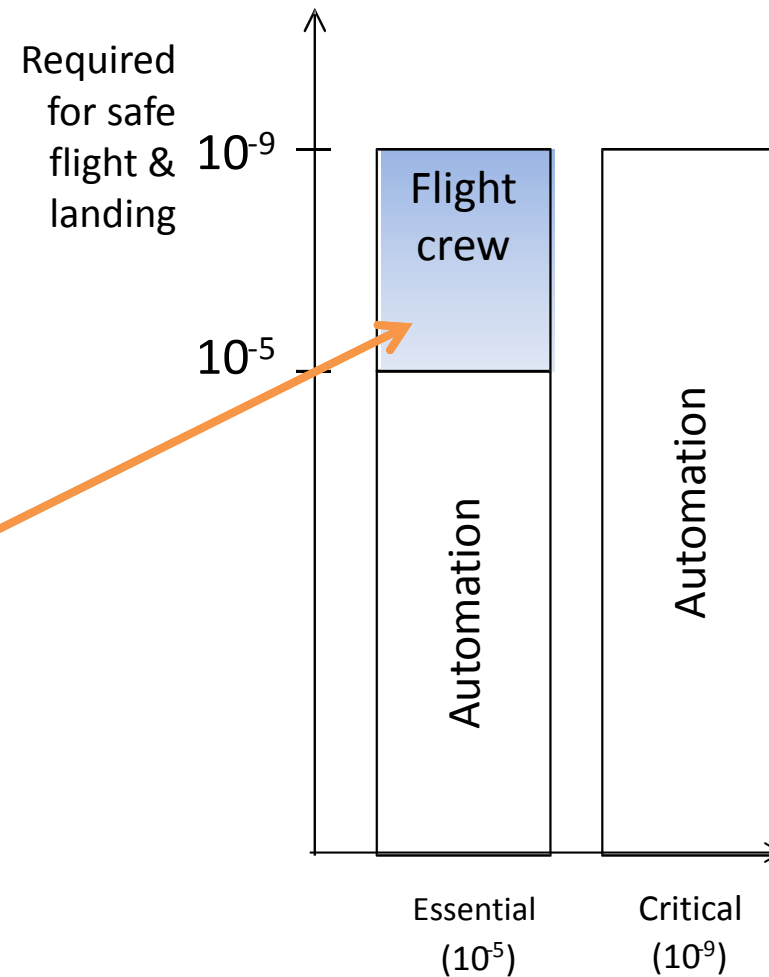


Two Key Questions

- What do we expect the human to do?
- What is the human doing now?

The Human Operator is the Barrier to FCF

Autonomous Automation	Semi-Autonomous/Supervised	Supervised Automation
<ul style="list-style-type: none"> • Vehicle Stability • Propulsion System Stability 	<ul style="list-style-type: none"> • Terrain Avoidance • Traffic Avoidance • Speed Envelope Protection 	<ul style="list-style-type: none"> • 4-D Trajectory • Fuel burn • ...



Flightcrew “mind the gap” between 10-9 hazard and 10-5 automation

A thought experiment

by Jon Holbrook, NASA NESC Human Factors Discipline Deputy

- Human error has been implicated in 70% to 80% of accidents in civil and military aviation (Weigmann & Shappell, 2001).
- Pilots intervene to manage aircraft malfunctions on 20% of normal flights (PARC/CAST, 2013).
- World-wide jet data from 2007-2016 (Boeing, 2016)
 - 244 million departures
 - 388 accidents

A thought experiment

		Outcome		
		Not Accident	Accident	
Attributed to Human Intervention	No	?	?	?
	Yes	20%	80%	?
		?	388	244,000,000

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A thought experiment

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	Yes	48,799,922	310	48,800,232
		243,999,612	388	244,000,000

When we characterize safety only in terms of errors and failures, we ignore the vast majority of human impacts on the system.

A Little Problem with our Assumptions

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How do you define “accident”?

Human-Centered?

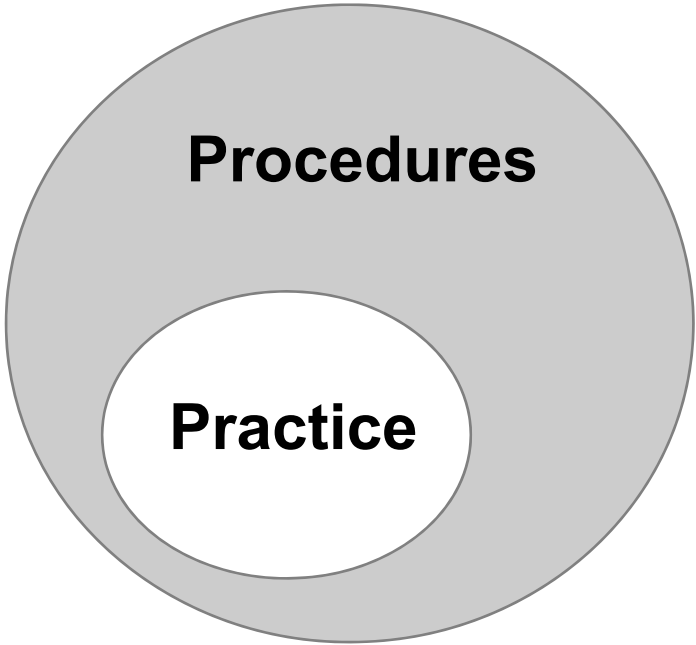
- It's the humans who make the system work and for humans' sake.
- The system is centered on the human.
- So we better design the system to be human-centered to best support the humans in their work.

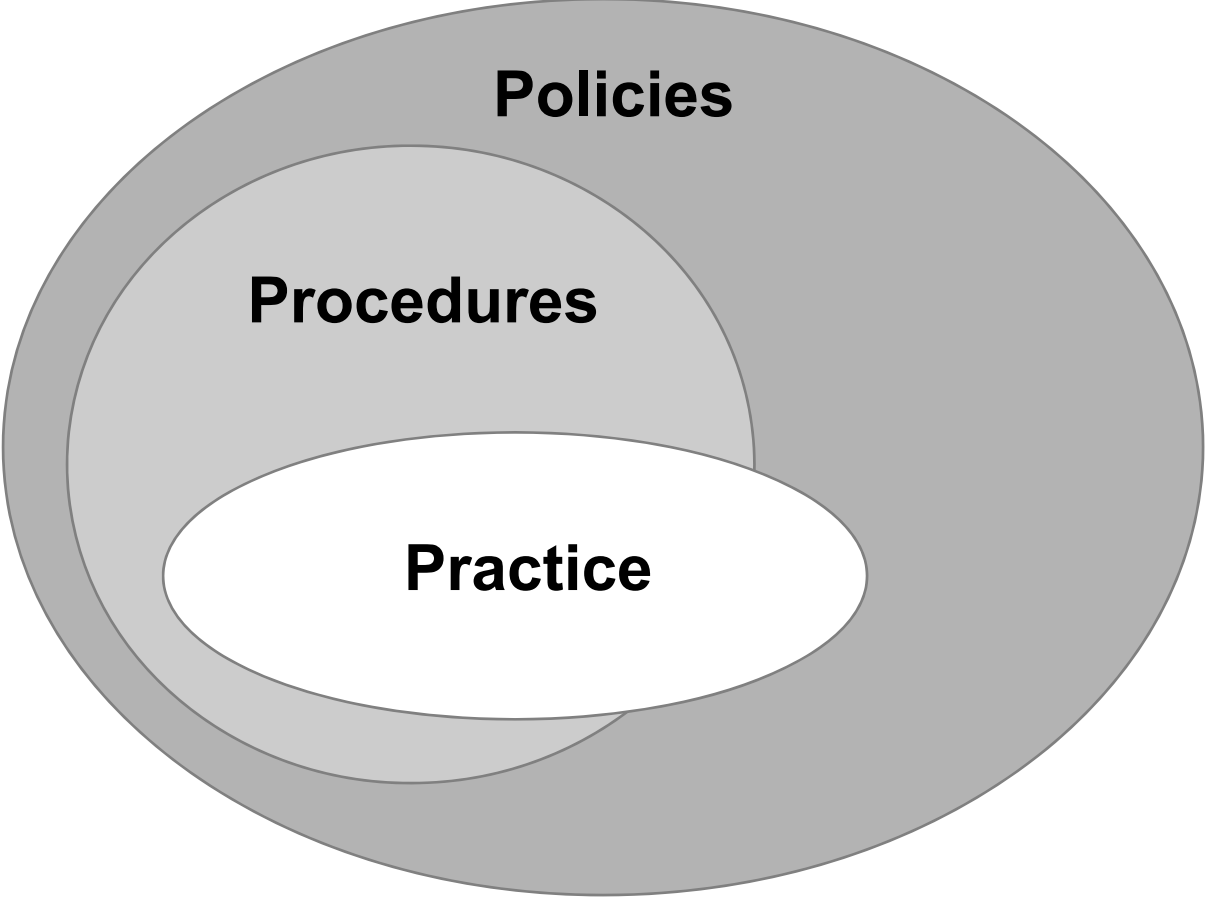
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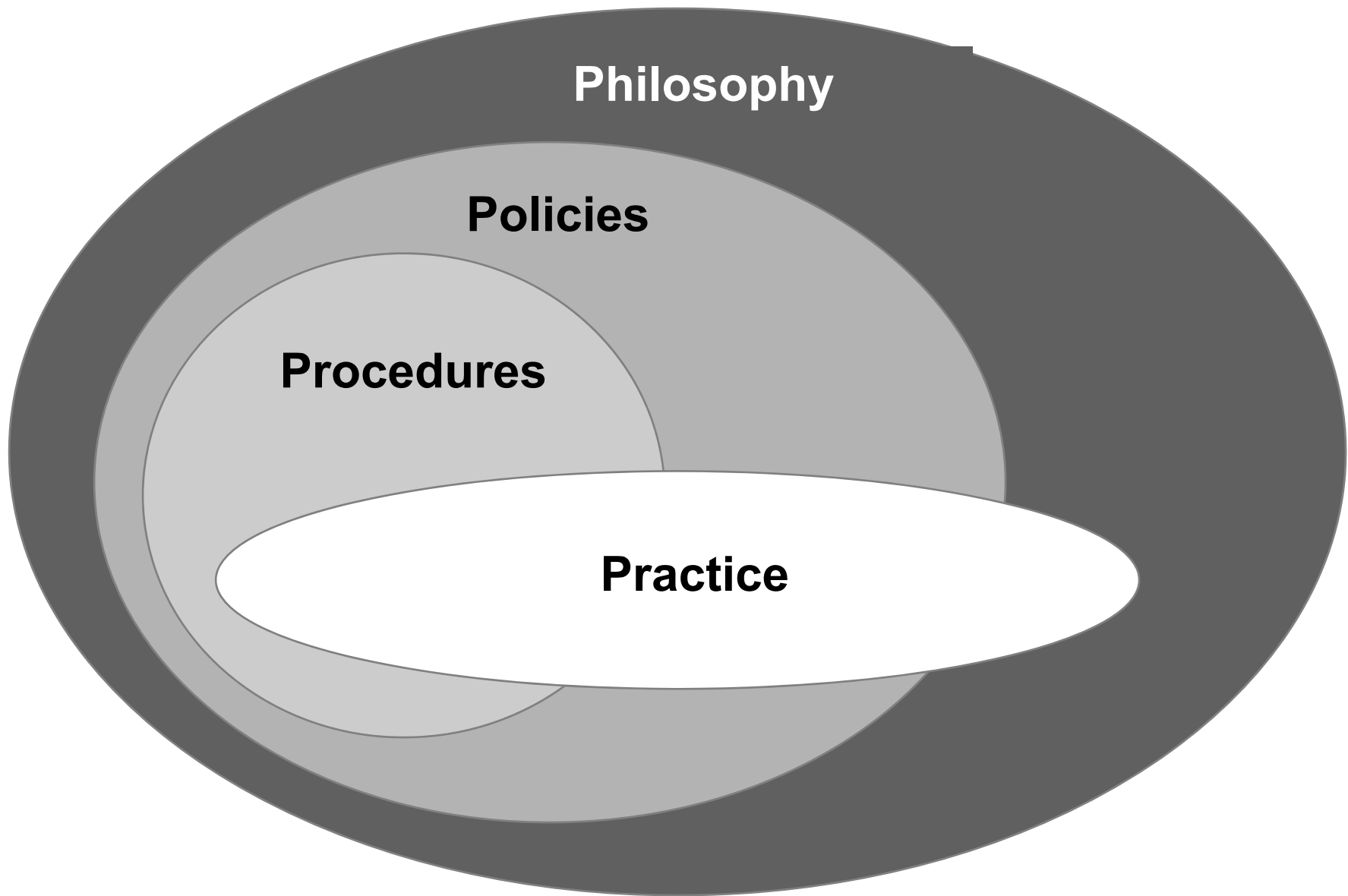
Thank you!

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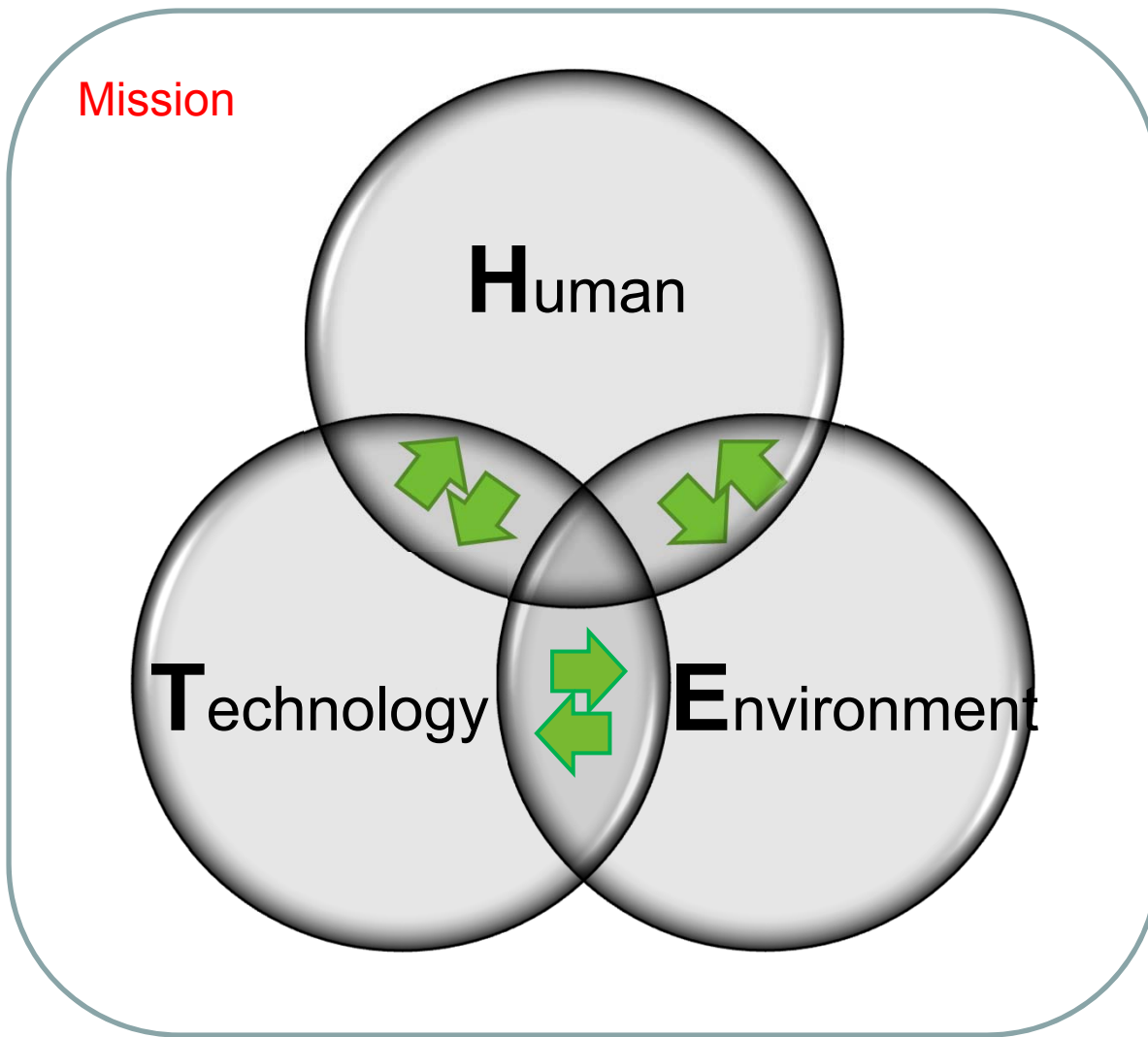


Philosophy

Policies

Procedures

Practice



THE Model