IS YOUR TEAM INSTRUMENT RATED?
(OR DEPLOYING 89,000 TIMES A DAY)

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Release Engineering Approaches
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- Fifteen years as a build/release engineer
- "Sober Build Engineer"
- @SoberBuildEng
Available on ITunes!

@buildscientist
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www.theshipshow.com
@ShipShowPodcast
In Preparation for our Flight...
“Culture?”

Set of shared mental assumptions that guide interpretation and action in organizations by defining appropriate behavior for various situations.

– Ravisí & Schultz, via Wikipedia
(via Damon’s talk)
“Culture” for Today

Incentives

+ Human Factors
“Culture” for Today

Incentives
(organizational, behavioral, and economic)

+ Human Factors
(methods for facilitating and fostering those incentives)
<table>
<thead>
<tr>
<th><strong>Craft</strong></th>
<th>Provided unique requirements, individuals perfecting their own methods &amp; techniques</th>
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<tbody>
<tr>
<td><strong>Trade</strong></td>
<td>Groups of “craftspeople” sharing domain knowledge</td>
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<tr>
<td><strong>Science</strong></td>
<td>Processes consistently repeatable by others, under different environments/conditions</td>
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<tr>
<td><strong>Industry</strong></td>
<td>Reduce/combine processes to optimize for specific business requirements or outcomes</td>
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Why Aviation?
Why Aviation?

But... when we’re talking incident response, the house is already on fire
Why Aviation?

Dev Ops
Why Aviation?

Dev

Ops
Why Aviation?

Scale much?
Visual Flight Rules
VISUAL FLIGHT RULES
Visual Flight Rules
INSTRUMENT FLIGHT RULES
INSTRUMENT FLIGHT RULES
INSTRUMENT FLIGHT RULES
WHAT IT IS

- Standardization
- Communication
- Expectations
- Remediation
STANDARDIZATION

A set of operational primitives based on your organizational and business requirements.
STANDARDIZATION

Leveraged to define your operational procedures.
STANDARDIZATION

Leveraged to define your operational procedures.
What it is

- Standardization
- Communication
- Expectations
- Remediation
COMMUNICATION

“We're cleared to New York's JFK Airport via the SAN FRANCISCO EIGHT, radar vectors to Linden, direct JSICA, direct Wilson Creek, Jet 80, Kansas City, Jet 24, Saint Louis, direct Brickyard, direct Rosewood, Jet 29, Jamestown, Jet 70, Wilkes Barre, to the LENDY FIVE arrival into JFK; climb and maintain fifteen, one-five-thousand; expect three-five-zero in ten; squawk six-three-seven-seven.”

– Redwood Flight 34’s Inaugural Clearance
COMMUNICATION

SFO SFO8

DEPARTURE ROUTE DESCRIPTION

TAKEOFF RUNWAYS 1L/R: Climbing right turn heading 030° or ATC assigned heading to cross SFO 6 DME at or above 3000 for RADAR vectors to assigned route/fix. Expect further clearance to filed altitude 10 minutes after departure.

TAKEOFF RUNWAYS 28L/R: Climb on SFO VOR/DME R-281 to NORMM INT/SFO 13 DME; then expect RADAR vectors to assigned route/fix. Expect further clearance to filed altitude 10 minutes after departure.

LOST COMMUNICATIONS:
If not in contact with departure control after reaching 3000, continue climb to filed altitude and proceed direct to assigned route/fix.

SAN FRANCISCO NINE DEPARTURE

SAN FRANCISCO, CALIFORNIA
SAN FRANCISCO INTL (SFO)
COMMUNICATION

In other words, trying to avoid this...
COMMUNICATION

• Hesitance to use appropriate terms to communicate the situation

• A transcontinental Boeing 707 arrives low on fuel & to bad weather; pilots do not use the single phrase necessary—“we’re declaring an emergency”—which would have activated emergency services (Avianca Flight 52)

• Misuse of defined terminology

• In 1995, a controller clears a 757 “directly” to the airport, setting off an accident chain (American Airlines Flight 965)
WHAT IT IS

• Standardization
• Communication
• Expectations
• Remediation
Once standards are established and requirements/intentions communicated, expectations and responsibilities can be derived.
WHAT IT IS

• Standardization

• Communication

• Expectations

• Remediation
What It Is

With expectations and responsibilities clarified, remediation processes can be *integrated* into processes & automation, not tacked on or “invented on the fly.”
What It Is Not

• Static

• Blind reliance on automation, tooling, or process

• “Fun-Verboten”
OCEANIC CLEARANCE
1036 110301 EGGX CLRNCE 553
DAL143 CLRD TO KDTW VIA PIKIL
NAT B
PIKIL 57N020W 58N030W 59N040W 59N
PRAWN YDP
FM PIKIL/1155 MNTN F320 M081
END OF MESSAGE
RECEIVED: 1036Z
STATUS: ACCEPTED
What It Is **Not**

- Static

- Blind reliance on automation, tooling, or process

- “Fun-Verboten”
Not Automation?!
**Not Automation?!**

- Misreading/looking at the wrong metrics
  - A 737 suffers an engine “disturbance”; after not looking at all the appropriate instruments, pilots shut down the good engine; the remaining (bad) engine eventually fails fully *(British Midlands Flight 92)*

- Partial automation failure and resulting confusion
  - After a series of instrument failures in the highly-automated A-330, the junior pilot pulls the plane into a prolonged stall *(Air France 447)*
Airbus Near Loss of Control at Paris Explained

by ROBERT P. MARK

April 1, 2013, 4:35 PM

An Air France A340-300 nearly crashed while on approach to Paris Charles de Gaulle Airport (CDG) on March 13 last year because the crew failed to understand the danger cues the aircraft’s flight systems were showing them, according to the French BEA accident investigation agency. The aircraft was already above the recommended altitude for glideslope intercept—with speedbrakes deployed—as it was being vectored for the Runway 8R Cat III ILS at CDG. On low-visibility approaches at CDG, ATC procedures also require aircraft to be slowed to less than 180 knots within 15 miles.
What It Is Not

- Static
- Blind reliance on automation, tooling, or process
- “Fun-Verboten”
Not “Fun Verboten”
Not “Fun Verboten”
Define organizational vocabulary & process primitives

Formalize roles, responsibilities, and priorities

Understand (current) limitations

Investigate outcomes
Define Your Approaches

• Define what you do today, focusing on the “operational requirements”

• Derive (or define) primitives

• Define your operational dictionary

• Make sure they’re owned!
GETTING RATED

• Define organizational vocabulary & process primitives
• Formalize roles, responsibilities, and priorities
• Understand (current) limitations
• Investigate outcomes
FORMALIZE “2R+P”

- Be able to answer “Who is responsible for that?”
- Drill/train or delegate
- Determine “priority classes”
GETTING RATED

• Define organizational vocabulary & process primitives
• Formalize roles, responsibilities, and priorities
• Understand (current) limitations
• Investigate outcomes
Line Up and Wait

For organizational change to even be a possibility, the current limitations need to be internalized.
Know When to Hold ‘Em
GETTING RATED

• Define organizational vocabulary & process primitives
• Formalize roles & responsibilities
• Understand (current) limitations
• Investigate outcomes
“Oops” Will Happen
AFTER THE “OOPS”

• NASA Aviation Safety Reporting System
• Separation of investigation roles
  • National Transportation Safety Board
• “No Blame” postmortems
  • (Though not for the reason you might think!)
Operational Models

Incentives + Human Factors