

# IS YOUR TEAM INSTRUMENT RATED?

(OR DEPLOYING 89,000  
TIMES A DAY)

J. Paul Reed  
Principal Consultant





# J. PAUL REED

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- Fifteen years as a build/release engineer
- “Sober Build Engineer”
- @SoberBuildEng





# AVAILABLE ON iTUNES!

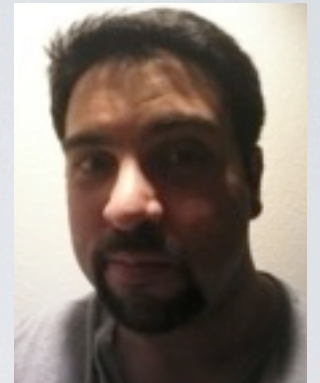
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[www.theshipshow.com](http://www.theshipshow.com)

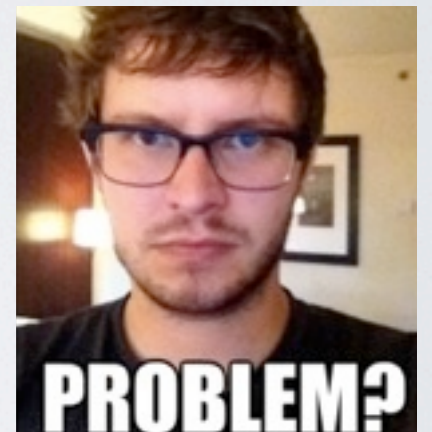
@ShipShowPodcast

@buildscientist



@eciramella

@cheeseplus



@sascha\_d



# IN PREPARATION FOR OUR FLIGHT...

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# “CULTURE?”

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

– Ravisi & Schultz, via Wikipedia  
(via Damon's talk)



# “CULTURE” FOR TODAY

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## **Incentives**

**+**

## **Human Factors**



# “CULTURE” FOR TODAY

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## **Incentives**

(organizational, behavioral, and economic)

**+**

## **Human Factors**

(methods for facilitating and fostering those incentives)



# WHY AVIATION?

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<b>Craft</b>	Provided unique requirements, individuals perfecting their own methods & techniques
<b>Trade</b>	Groups of “craftspeople” sharing domain knowledge
<b>Science</b>	Processes consistently repeatable by others, under different environments/conditions
<b>Industry</b>	Reduce/combine processes to optimize for specific business requirements or outcomes

“Progress”





# WHY AVIATION?

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# WHY AVIATION?

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But... when we're talking incident response,  
*the house is already on fire*



# WHY AVIATION?

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## **Dev Ops**

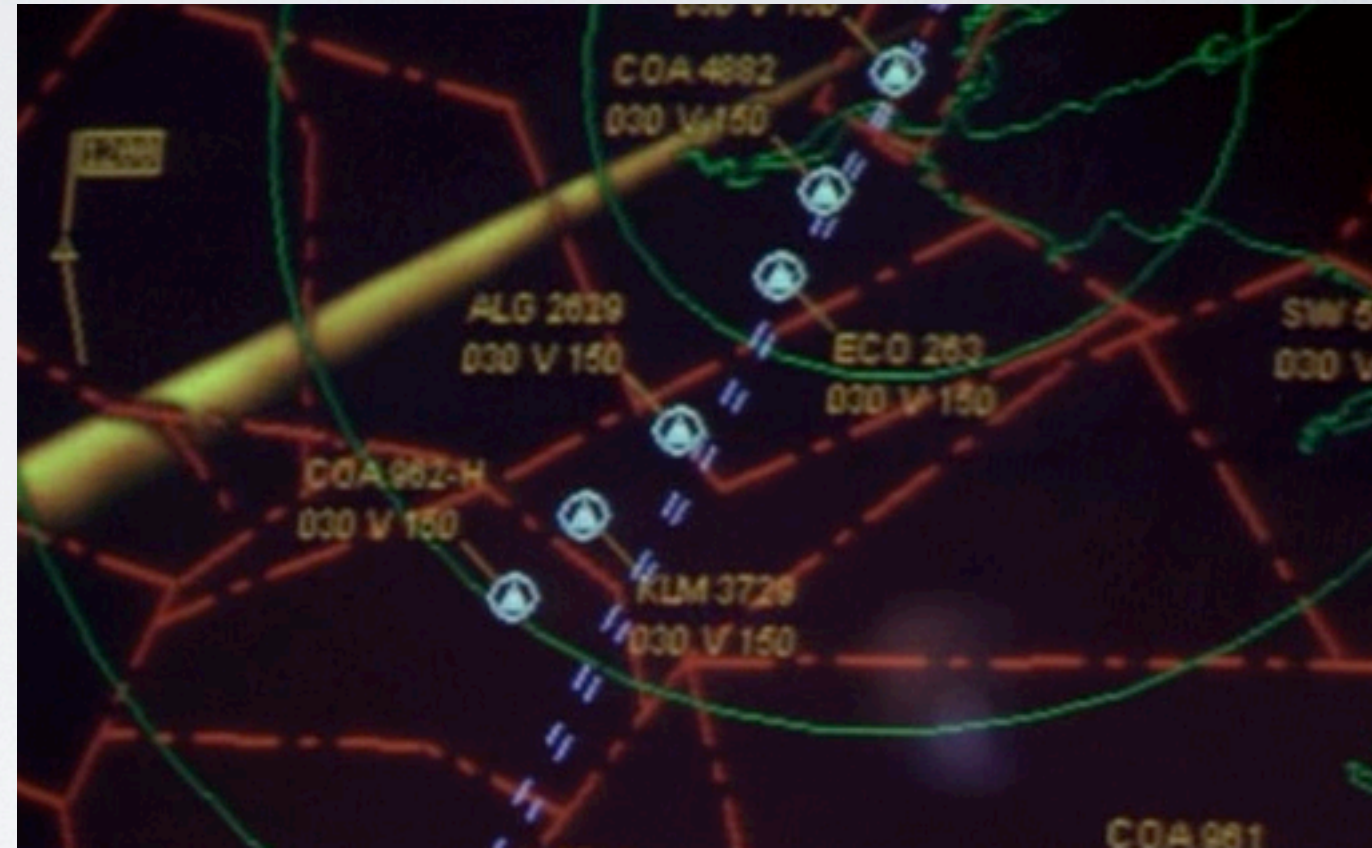


# WHY AVIATION?

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**Dev**

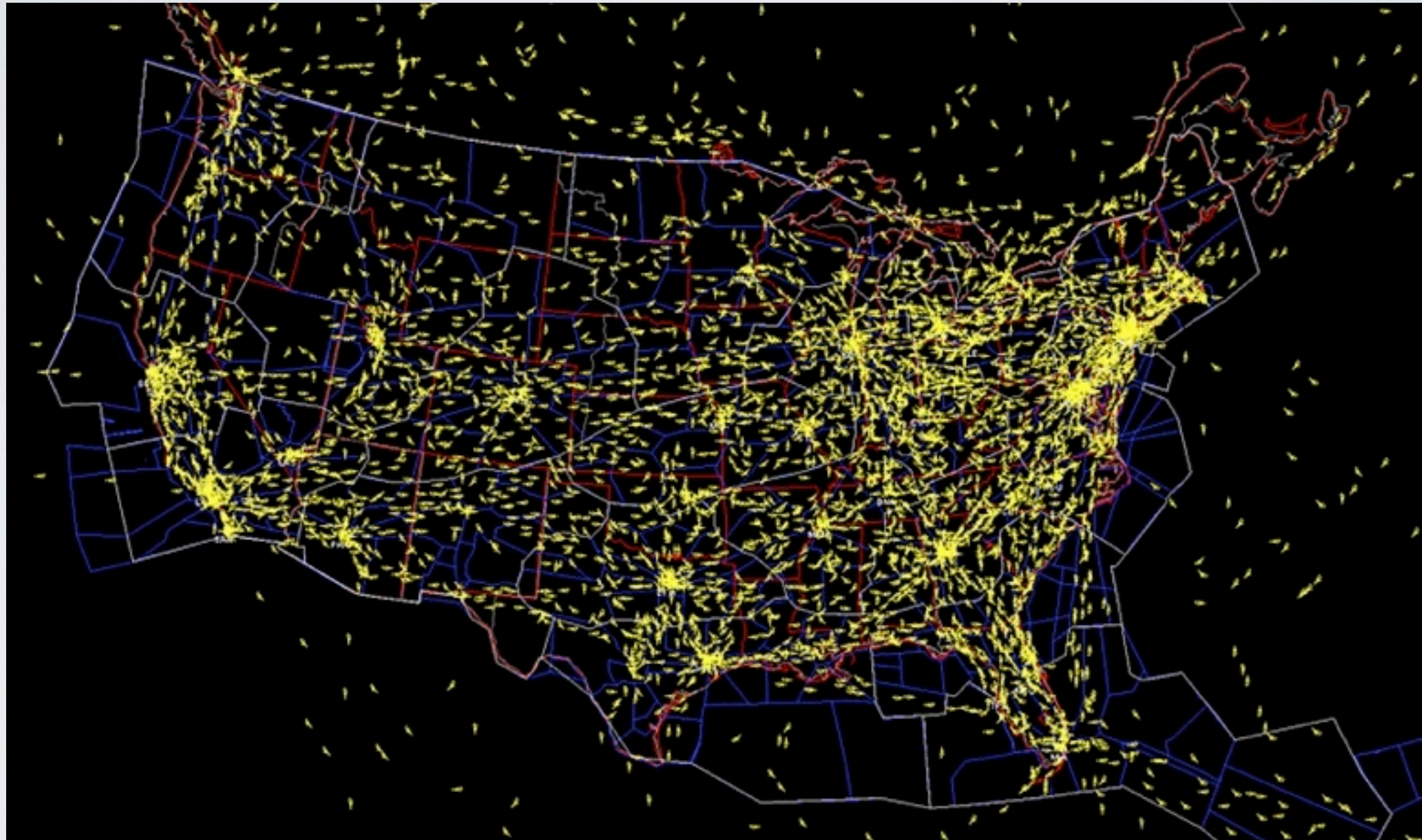


**Ops**



# WHY AVIATION?

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Scale much?



# VISUAL FLIGHT RULES

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# VISUAL FLIGHT RULES





# VISUAL FLIGHT RULES





# INSTRUMENT FLIGHT RULES

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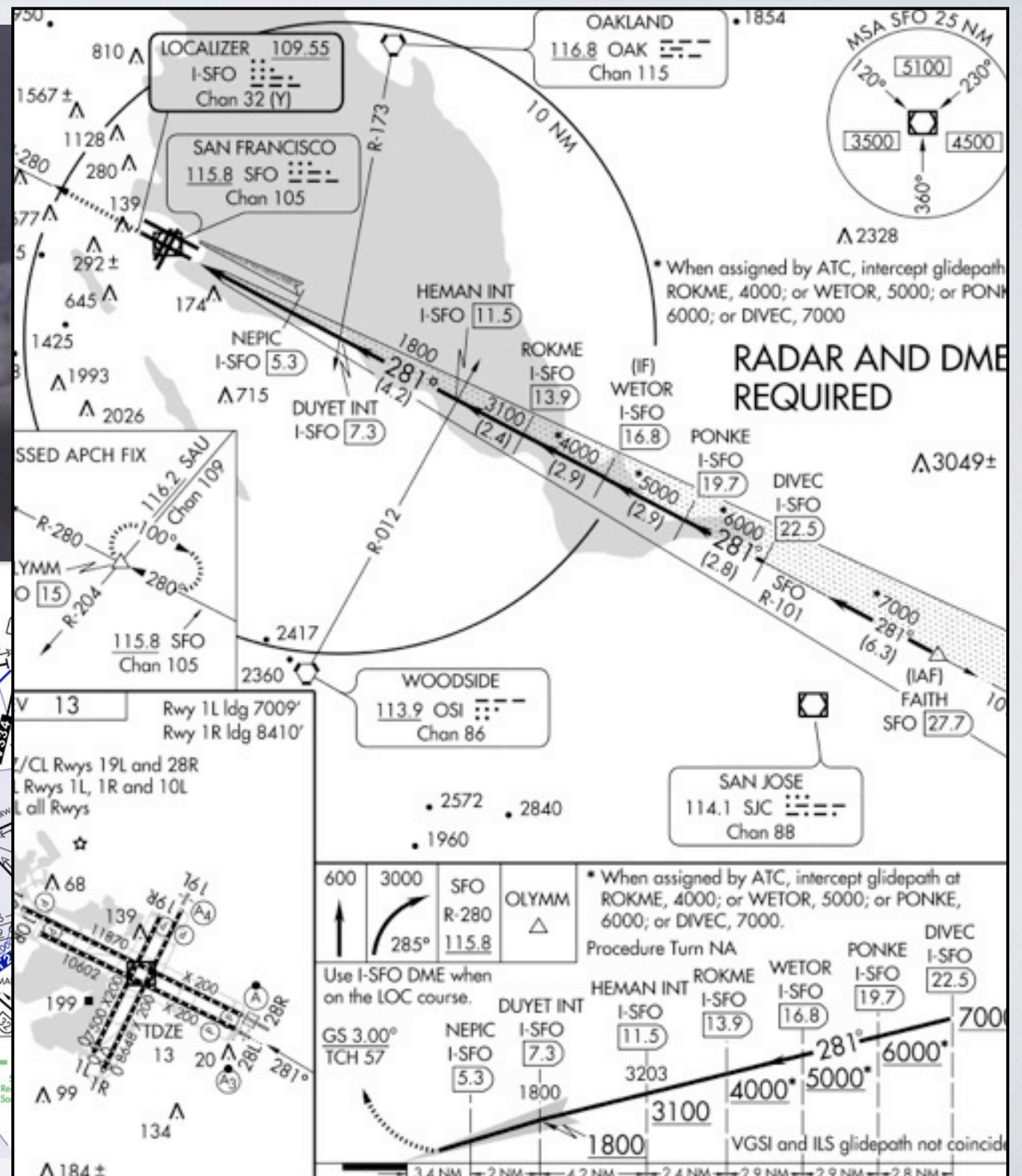
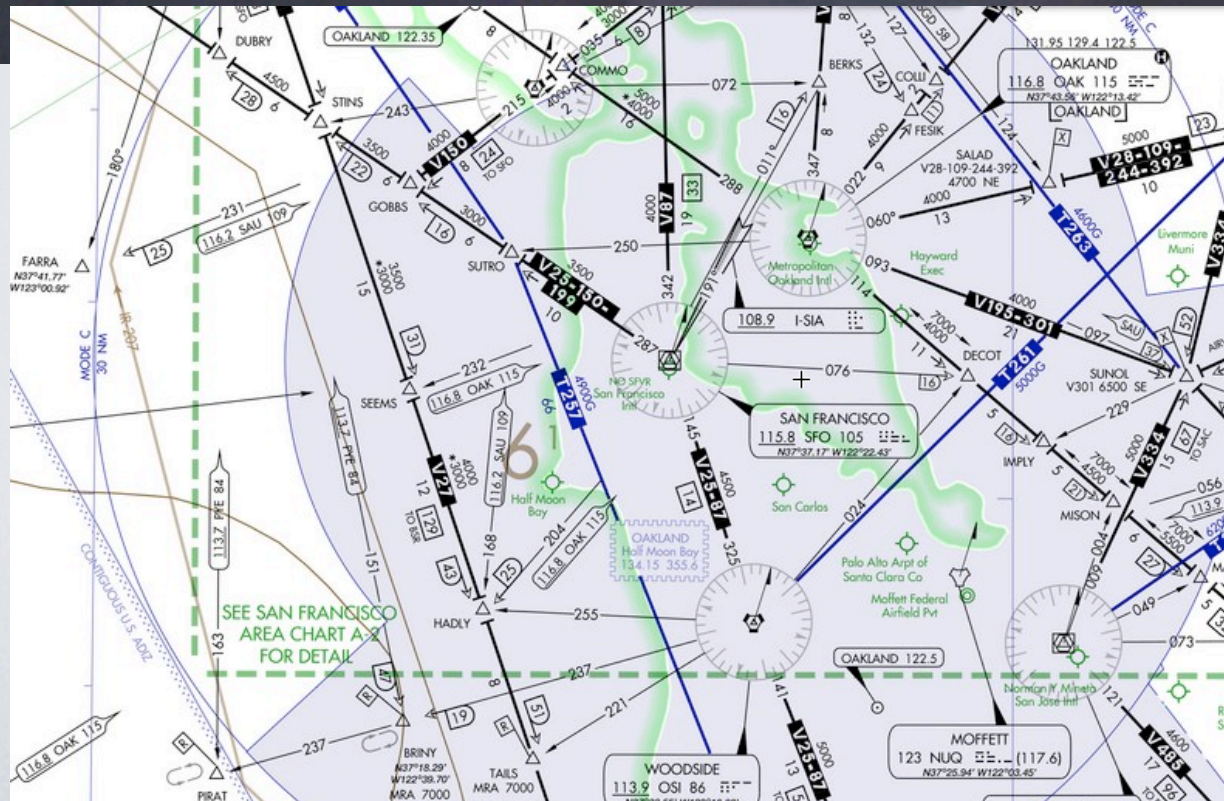




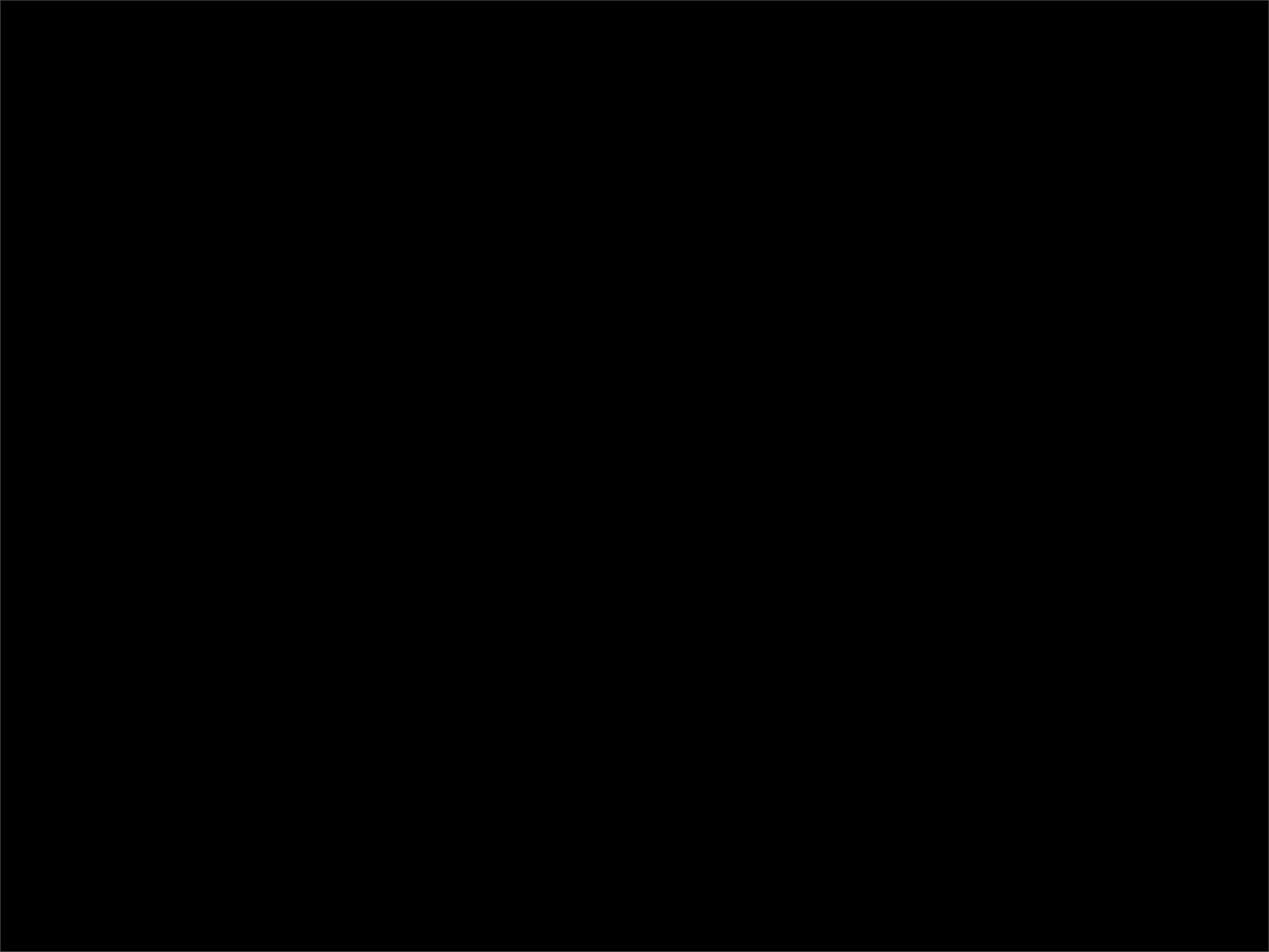




# INSTRUMENT FLIGHT RULES









# WHAT IT IS

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- **Standardization**
- Communication
- Expectations
- Remediation



# STANDARDIZATION

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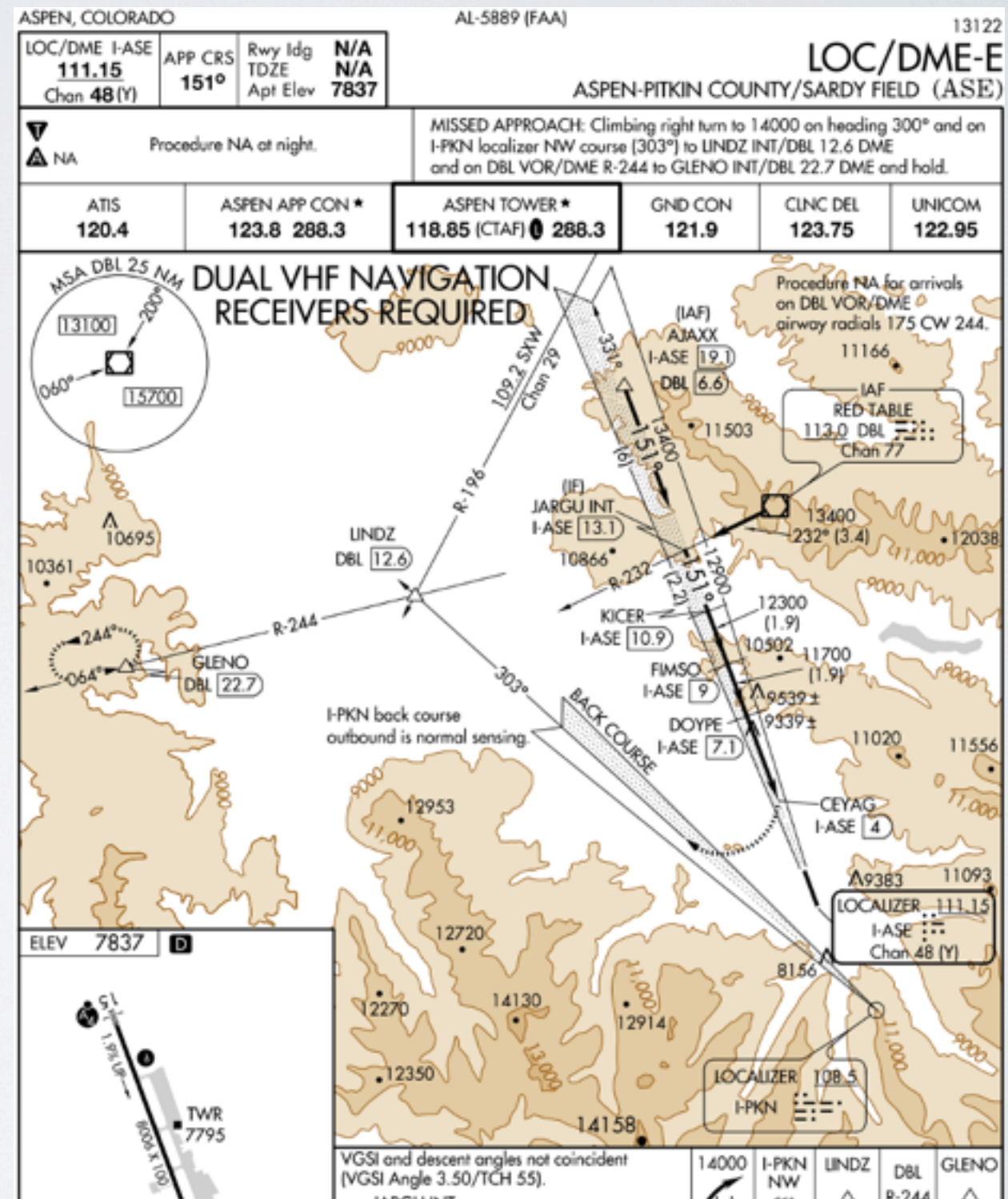
A set of  
**operational  
primitives** based  
on your  
organizational  
and business  
requirements.





# STANDARDIZATION

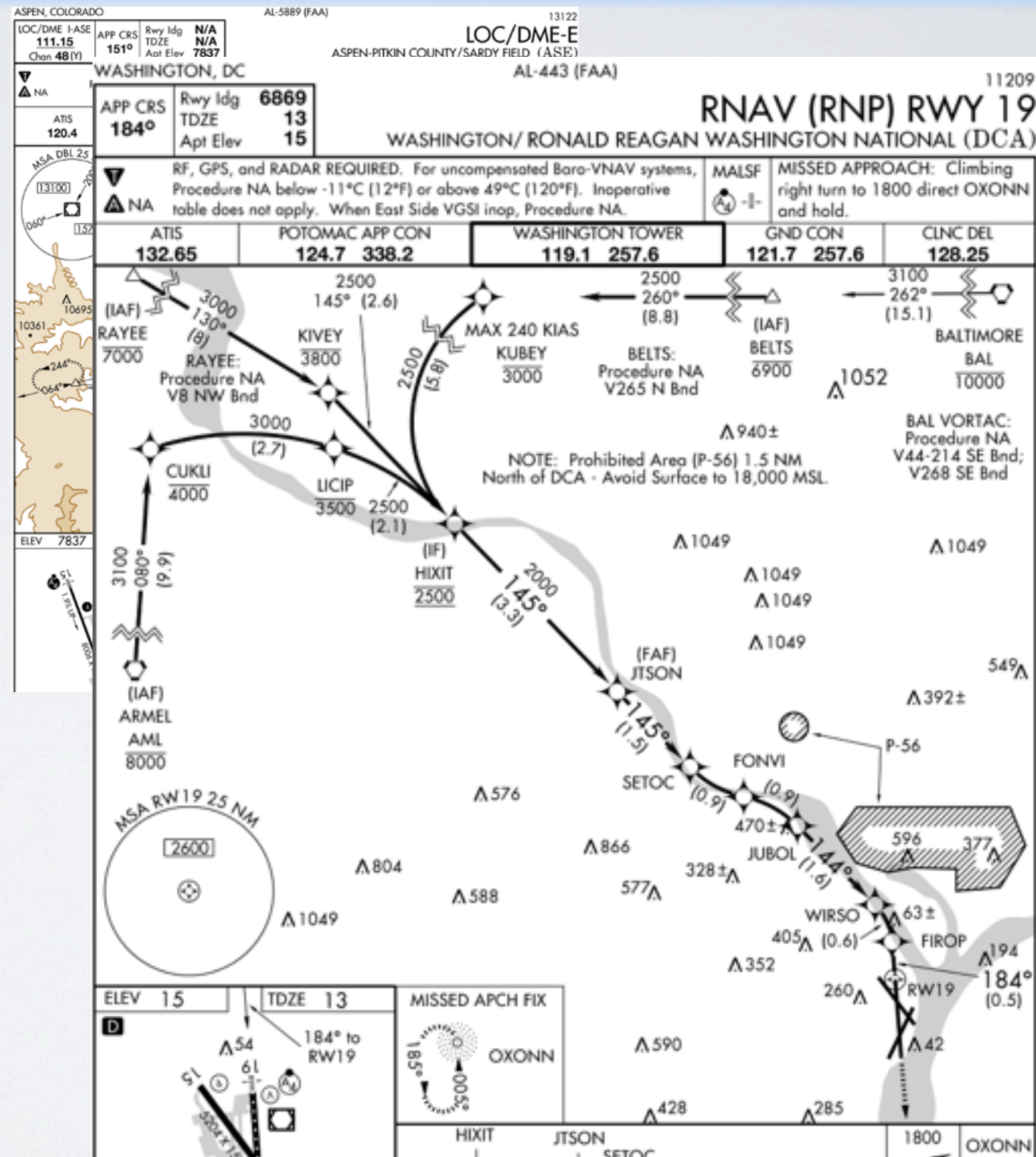
Leveraged to  
define your  
**operational  
procedures.**





# STANDARDIZATION

Leveraged to  
define your  
operational  
procedures.





# WHAT IT IS

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- Standardization
- **Communication**
- Expectations
- Remediation



# COMMUNICATION

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“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.

al Clearance

## SAN FRANCISCO NINE DEPARTURE

SAN FRANCISCO, CALIFORNIA  
SAN FRANCISCO INTL (SFO)

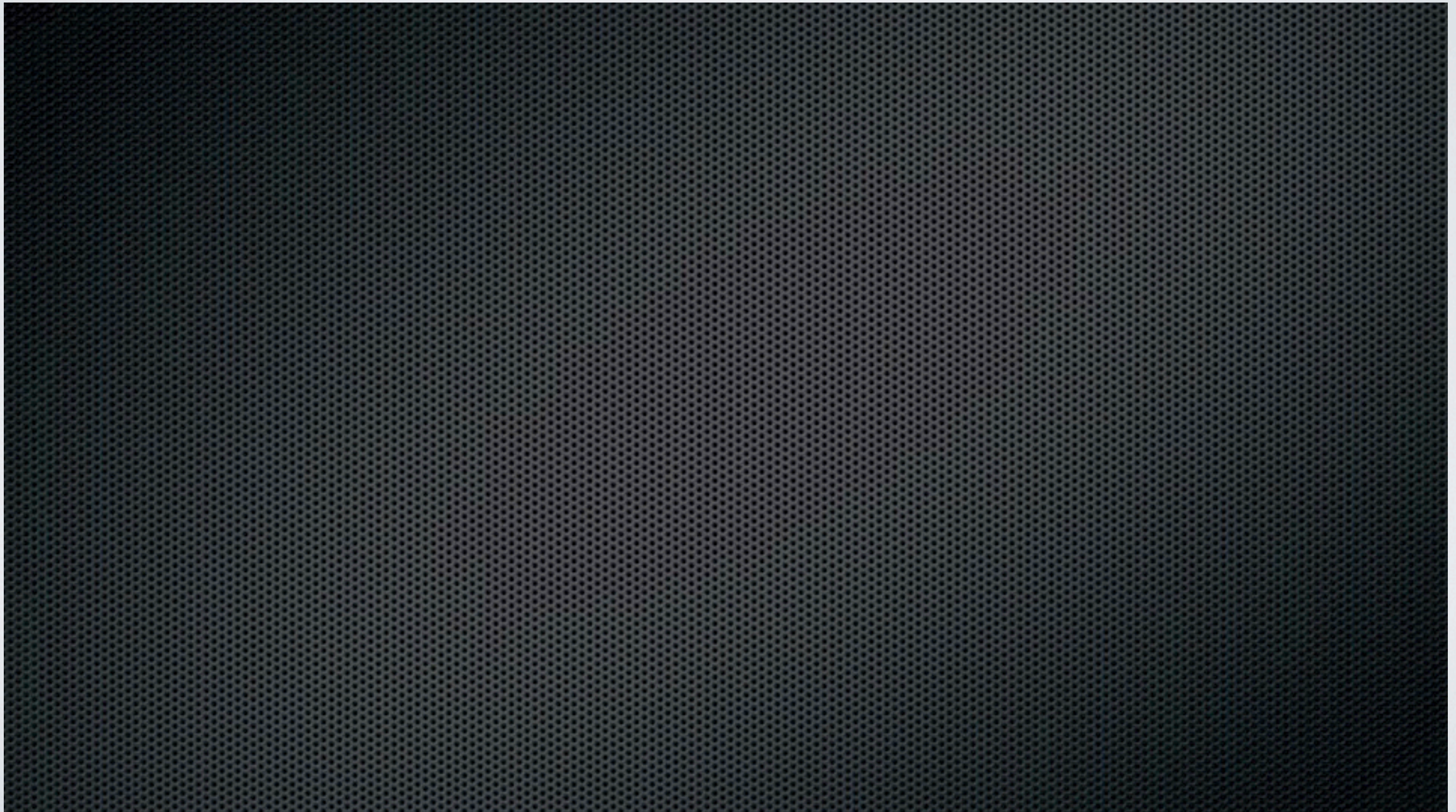




# COMMUNICATION

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In other words, trying to avoid this...





# COMMUNICATION

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- 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

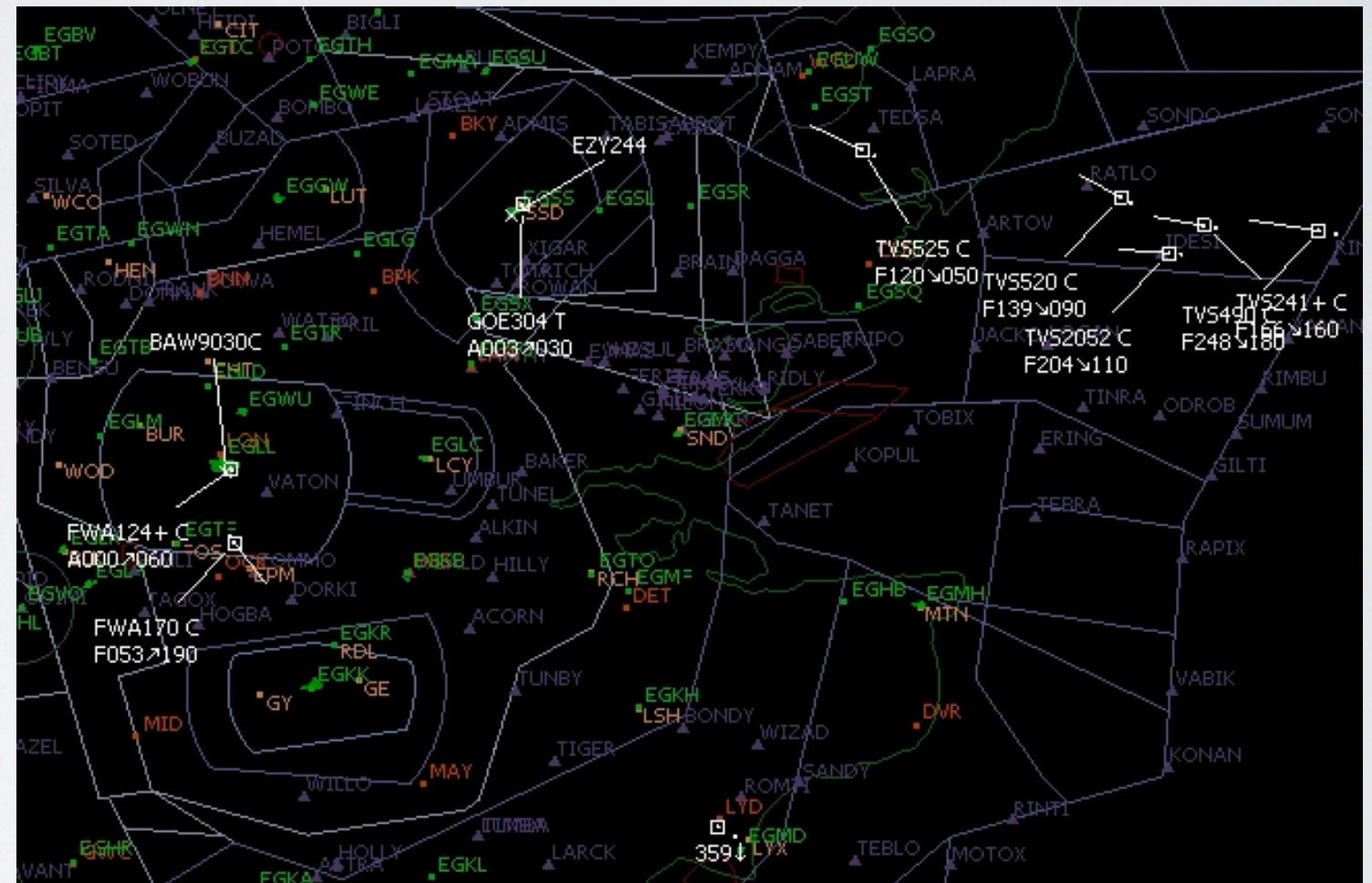
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- Standardization
- Communication
- **Expectations**
- Remediation



# EXPECTATIONS

Once standards are established and requirements/intentions communicated, **expectations and responsibilities can be derived.**





# WHAT IT IS

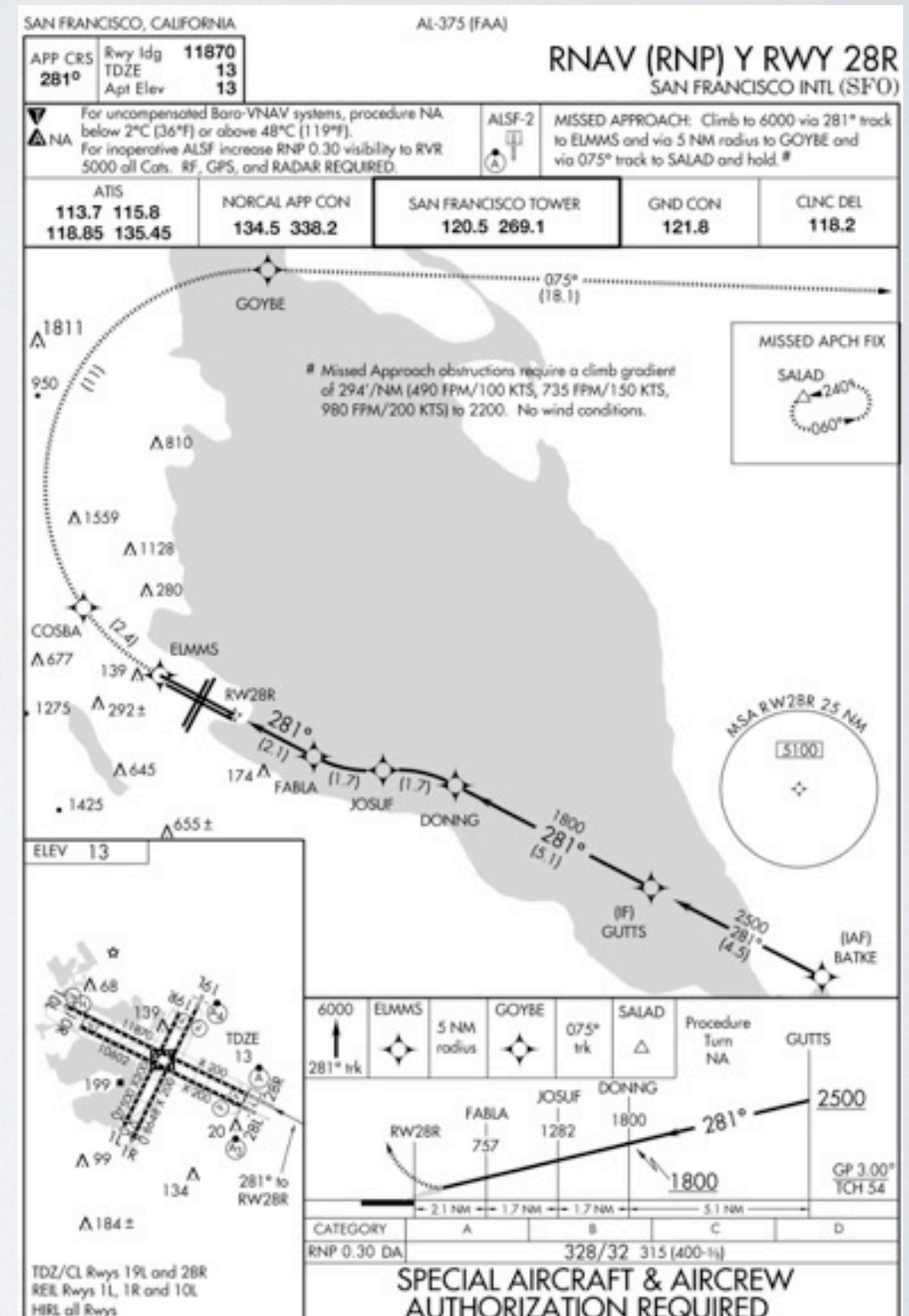
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- Standardization
- Communication
- Expectations
- **Remediation**



# 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**

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- Static
- Blind reliance on automation, tooling, or process
- “Fun-Verboten”



# NOT STATIC

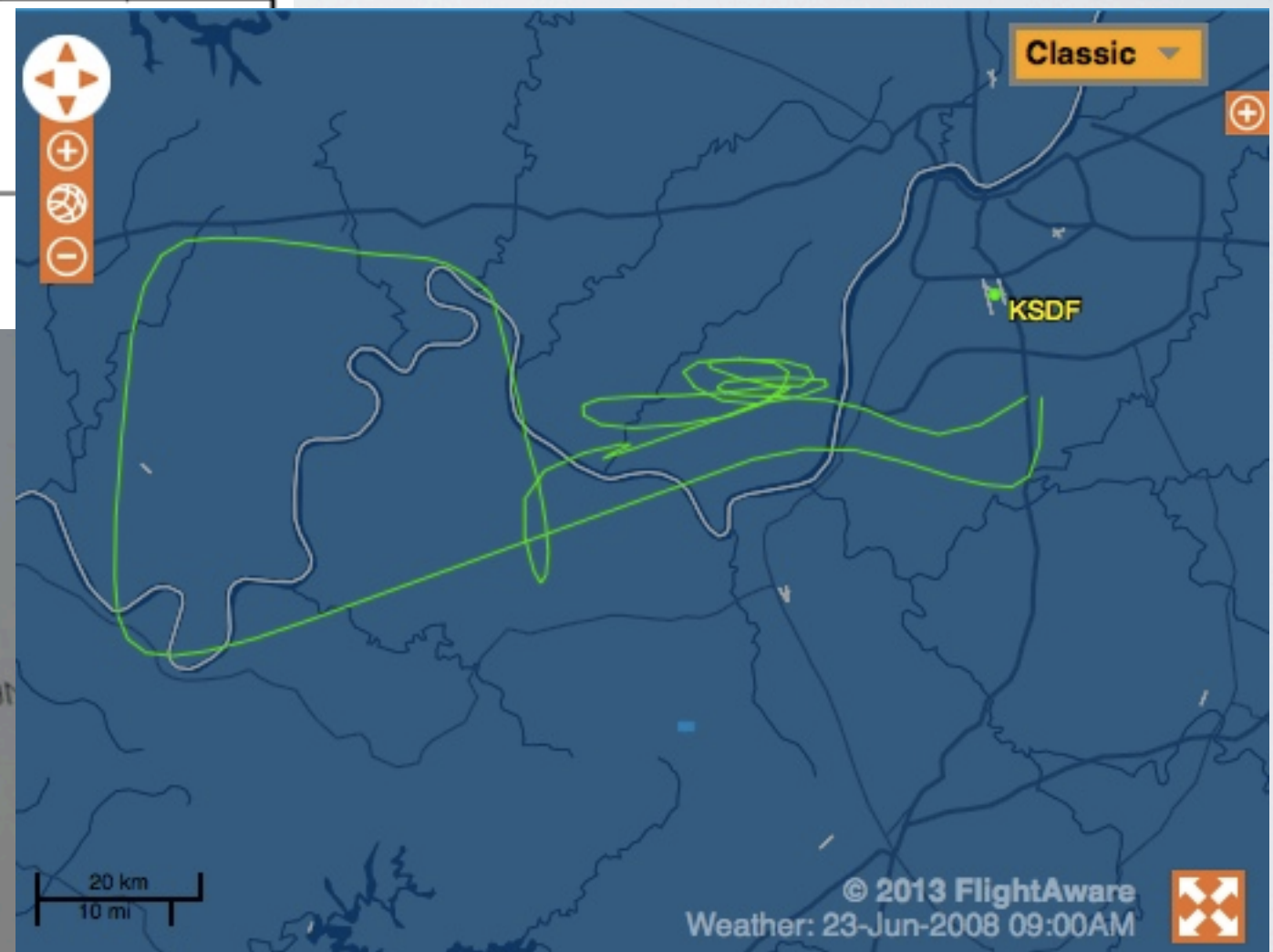
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		(FAA USE ONLY) <input type="checkbox"/> PILOT BRIEFING <input type="checkbox"/> VNR		TIME STARTED		SPECIALIST INITIALS	
FLIGHT PLAN		<input type="checkbox"/> STOPOVER					
1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE / SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
<input type="checkbox"/> VFR <input type="checkbox"/> IFR <input type="checkbox"/> DFR			KTS		PROPOSED (Z)	ACTUAL (Z)	
8. ROUTE OF FLIGHT							
9. DESTINATION (Name of airport and city)		10. EST. TIME ENROUTE		11. REMARKS			
		HOURS MINUTES					
12. FUEL							
HOURS							
16. COLOR CODE							

OCEANIC CLEARANCE

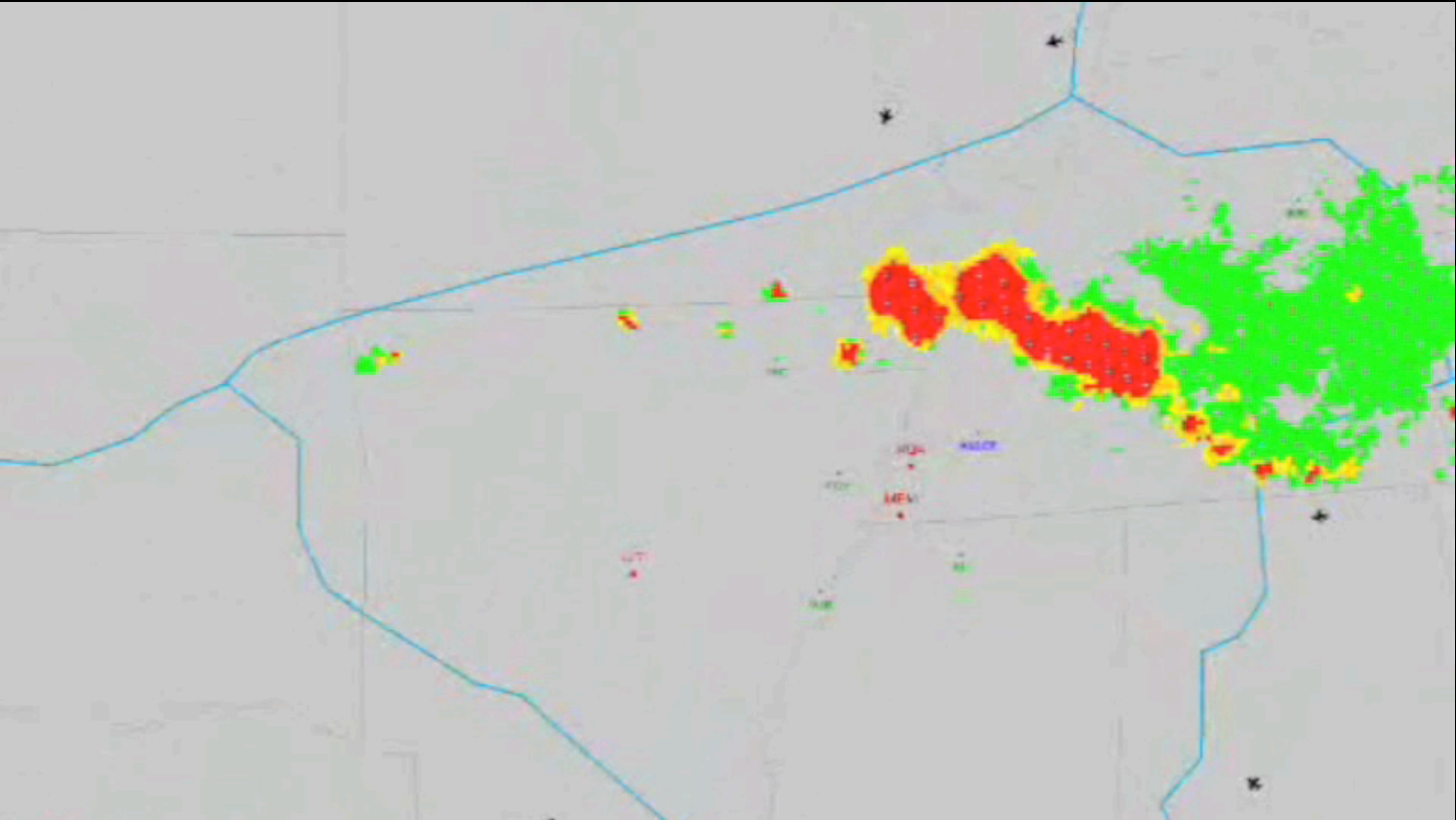
1036 110301 EGGX CLRNC 559  
DAL143 CLRD TO KDTW VIA PIKIL  
NAT B  
PIKIL 57N020W 58N030W 59N040W 59N  
PRAWN YDP  
FM PIKIL/1155 MNTN F320 M081  
END OF MESSAGE

RECEIVED: 1036Z  
STATUS: ACCEPTED

.N176DZ 0143/01 EDDF/KDTW 10:30









# WHAT IT IS **Not**

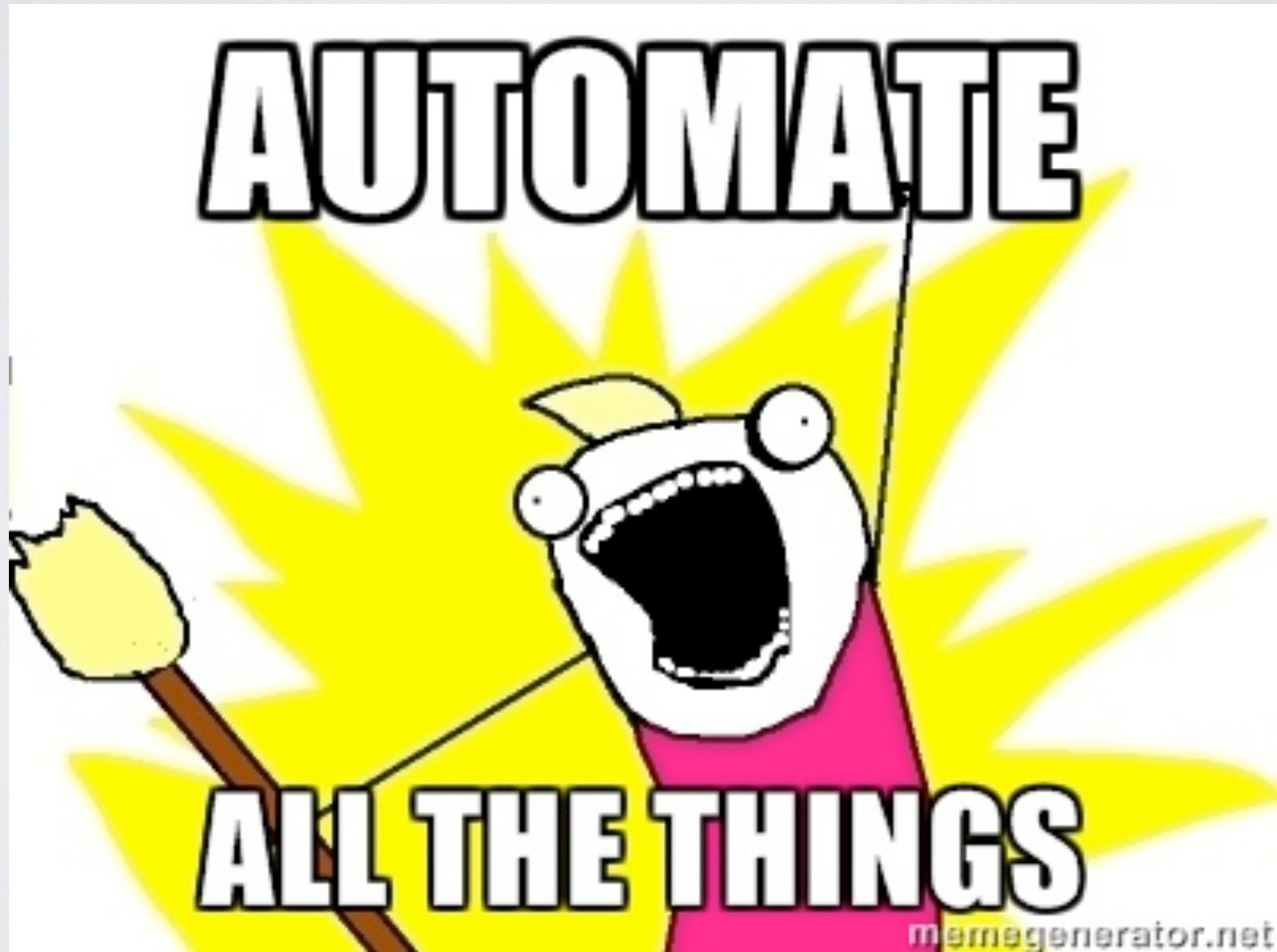
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- Static
- Blind reliance on automation, tooling, or process
- “Fun-Verboten”



# NOT AUTOMATION?!

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# NOT AUTOMATION?!

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- 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)



# NOT AUTOMATION?!



NEWS CHANNELS | PUBLICATIONS | RESOURCE CENTER | OPINION |

## Airbus Near Loss of Control at Paris Explained

AINSAFETY » APRIL 1, 2013

by ROBERT P. MARK



*An Air France A340-300 nearly crashed while on approach to Paris Charles de Gaulle Airport on March 13, 2012, because the crew failed to understand the danger cues the aircraft's flight systems were showing them.*

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 VERBODEN”

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# GETTING “INSTRUMENT RATED”

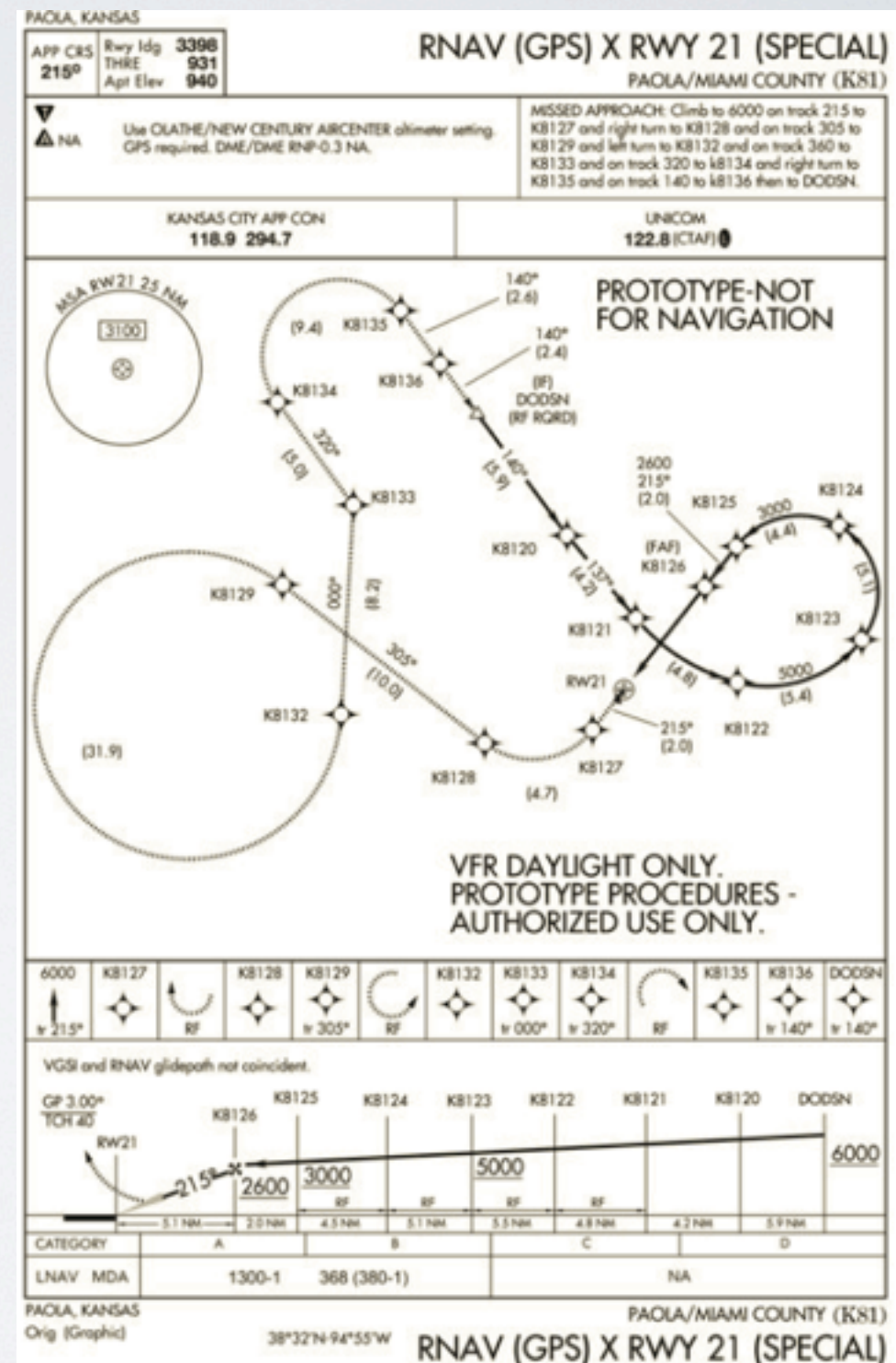
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- Define organizational vocabulary & process primitives
- Formalize roles, responsibilities, and priorities
- Understand (current) limitations
- Investigate outcomes



# 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!





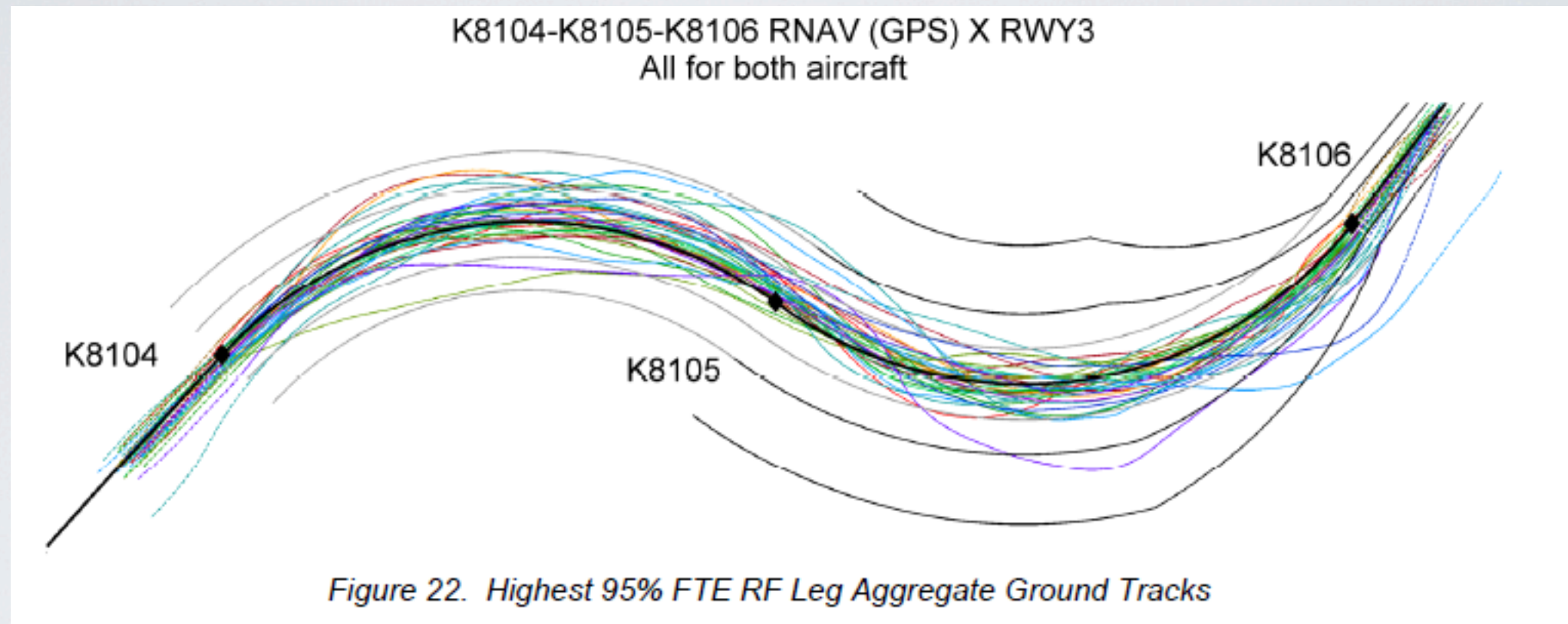
# GETTING RATED

---

- 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

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- Define organizational vocabulary & process primitives
- Formalize roles, responsibilities, and priorities
- **Understand (current) limitations**
- Investigate outcomes



# LINE UP AND WAIT

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For organizational change to even be a possibility, the current limitations need to be internalized.



# KNOW WHEN TO HOLD 'EM

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# GETTING RATED

---

- Define organizational vocabulary & process primitives
- Formalize roles & responsibilities
- Understand (current) limitations
- **Investigate outcomes**



# “OOPS” WILL HAPPEN

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# AFTER THE “OOPS”

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- 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

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**Incentives**

**+**

**Human Factors**





**J. Paul Reed**

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Simply Ship. Every Time.