

# Topic of the Month March 2015 Single Pilot CRM



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Presented to: Salem Area Pilots  
By: Thomas Gorski CFI  
Date: March 7, 2015



**2014/10/01-064 (DPP)** Original Author, FAASTeam; POC Kevin Clover, AFS-850 Operations Lead, Office 562-888-2020; reviewed by John Steuernagle 10/01/2014  
Revised by Tom Gorski 503.551.1700 for FAASTeam Topic of the Month Seminar  
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# Welcome

- Interactive Presentation
- Restrooms
- Exits & Emergency Evacuation
- Sponsor Acknowledgment
- Seminar Recording
- Breaks



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**Set the Tone-** being warm and welcoming the people to my hangar for an Interactive presentation. My style is getting you comfortable with asking relevant questions frequently. It is important to address your concerns and your questions. We have a holding pattern for unanswered questions. We can learn much from each other. Questions and answers are very important, so frequent Q/A interaction is encouraged.

Restrooms, exits, evacuation.

Acknowledge Sponsors.

Seminar / Webinar engineering with priority on Seminar. Webinar is running in the background.

10 Min break.

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# Overview

## 1st Hour

- **Presenter's Background**
- **Overview of FAASTeam**
- **SRM-CRM History**
- **Safety Benefits of SRM**
- **Present & Future SRM-CRM Technologies**
- **How GA pilots can use SRM-CRM**

## 2nd Hour

- **Practical Risk Management Scenarios**

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During this first hour I am going to speak a bit about my background, and give you an overview of the FAASTeam.

Then I want to take a few minutes to talk about the history of Crew Resource Management— a process and technology that's a significant benefit to General Aviation.

We'll discuss the safety benefits of CRM,  
As well as present and future CRM technologies.  
And we'll talk about how to use CRM today.

During the second hour we will actively participate in Interactive Risk Management Scenarios.

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## Presenter's Background

- **1976 – US Army Avionics Technician**
- **1984 – 2008 CFI & Charter C414A, LR-JET, CE-500**
- **2008 – 2013 Evergreen Airlines B-747-200, LCF, 400  
Director of Flight Standards**
- **2013 – Present Contract Pilot, CFI, FAA Volunteer**

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Discussion of my background.

1976 – US Army Avionics Technician

1984 – 2008 CFI & Charter C414A, LR-JET, CE-500

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Director of Flight Standards

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# Safety Seminars

FAASTeam Website  
[www.faasafety.gov](http://www.faasafety.gov)

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Activities of the FAASTeam are organized and indexed through the Website  
FAASAFETY.GOV

Faasafety.gov is a portal between the FAA and the aviation community.

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# Mission Statement

Improve the Nation's aviation accident rate by conveying safety principles and practices through training, outreach, and education; while establishing partnerships and encouraging the continual growth of a positive safety culture within the aviation community.

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**The mission of the FAASTeam is:**

Improve the Nation's aviation accident rate by conveying safety principles and practices through training, outreach, and education; while establishing partnerships and encouraging the continual growth of a positive safety culture within the aviation community.

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## Relationship With Aviation Community

Individuals who makes a conscious effort to promote aviation safety and become part of the shift in safety culture:

Pilots – participate in WINGS - Pilot Proficiency Program

Mechanics – participate in AMT Awards Program

Everyone who attends FAAS Team Seminars

# Thank You!

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Our Safety Culture is a function of the relationship with the aviation community, and that is made up of individuals who make an effort to promote aviation safety. Those individuals, by virtue of their conversations, their knowledge and experience serve to facilitate a shift in the safety culture.

I am talking about Pilots who participate in the WINGS Pilot Proficiency Program.

Mechanics who participate in the AMT awards program, and everyone who Attends Safety Seminars

On behalf of the FAA Safety Team I want to thank each one of you who are here today. Thank you!

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# What is CRM / SRM Training?

- **CRM= “Training to make us work together better.”**
- **SRM = “Training to make us fly safer.”**

*SRM...the art of managing all the resources\* available to a pilot prior to and during flight to ensure a successful flight.*

\* both onboard the aircraft and from outside sources

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“What is CRM?”

Do you know what the acronyms stand for? Does anyone not know what these acronyms stand for?

What came first, SRM or CRM?

A typical response is “Training to make us work together better.”

or in the case of SRM “Training to make us fly safer”

Many of the principles of CRM led to the development of single-pilot resource management (SRM). SRM is defined as

**(Click)** the art of managing all the resources (both onboard the aircraft and from outside sources) available to a pilot prior to and during flight to ensure a successful flight.

The rationale for SRM & CRM is reducing the frequency and severity of errors that are pilot/crew-based. This concern is addressed in the RMH. It is more important to know why we are teaching this than to recite the definitions, processes and flows regarding SRM.

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Additional Notes may or may not be discussed

Task Management and SA are two of six areas of SRM, found in the PTS. The four others are ADM, RM, CFITA, and AM. SRM includes the concepts of CRM. SRM training helps pilots maintain situational awareness by managing automation, associated aircraft control, and navigation tasks. This enables pilots to accurately assess hazards, manage resulting risk potential, and make good decisions.

In the process of teaching SRM we risk losing sight of why it is important.



# Crew Resource Management (CRM)



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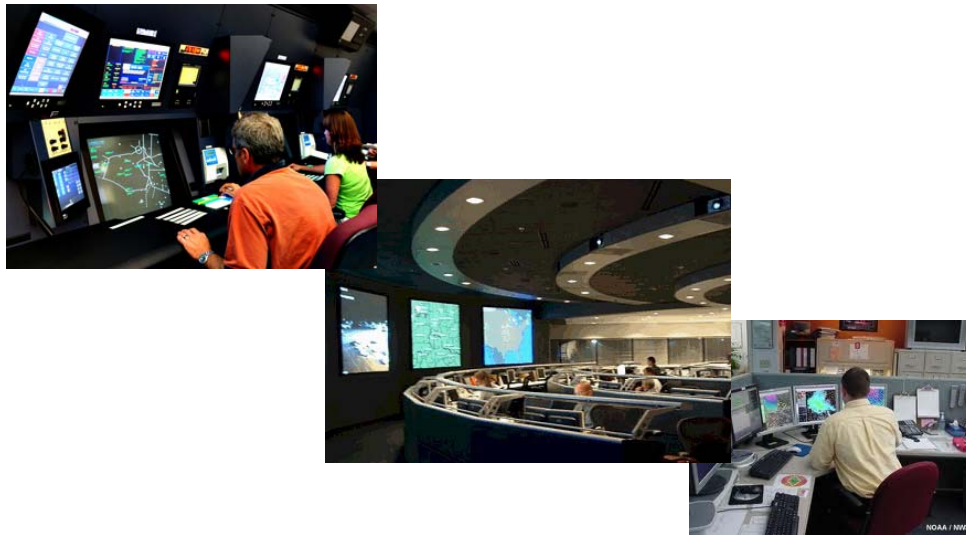
In the beginning the captain was in charge and made all the decisions with regard to the safety of the flight in isolation.

These days the captain's still the final authority but the crew are involved in the decision making process and that's a very good thing. The captain manages those Resources to effect safe, efficient, and profitable operations.

Can you identify who the captain is in the lower right photo?

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## ATC, Flight Dispatch, & Flight Following



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Captains also draw on a host of resources on the ground provided by Air Traffic Controllers of course but also **(Click)**

Flight Dispatch and Flight Following personnel **(Click)**

Meteorologists, and Maintenance specialists.

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# Automation Resources



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And of course they have autopilot and flight management resources to manage as well. **(Click)**

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## UAL 173

- 28 December 1978
- DEN – PDX
- 181 pax 8 Crew
- Gear Light Out
- 10 Fatalities  
23 Seriously Injured
- Breakdown in cockpit management and teamwork



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On December 28, 1979 UAL 173, a DC-8, was flying from DEN to PDX. After extending the landing gear on final approach a loud thump was heard, accompanied by abnormal vibration and yaw. **The right main landing gear retract cylinder assembly had failed due to corrosion, and that allowed the right gear to free fall.** Although it was down and locked, the free fall of the gear damaged a micro switch so severely that it failed to complete the circuit to the cockpit green light that tells the gear is down and locked. The flight crew became so absorbed with diagnosing the gear problem that they failed to monitor their fuel state and calculate a time when they needed to land or risk fuel exhaustion. The captain had significantly more overall flying time, as well as much more time in this type of aircraft, than either the first officer or the flight engineer. This may have made subordinate crew members more likely to rely upon the captain, and less likely to openly question his decisions. At this point in history, a serial "chain of command" was more the norm than CRM. The gear down and locked indication is above the wing and was visually confirmed. This accident played a pivotal role in identifying the need for a more parallel "team" approach to resource management as well as greater assertiveness on the part of subordinate crew members. There was anecdotal information following the accident that some of the surviving passengers were able to find taxis from the crash site to the airport, and were later found waiting in the baggage claim area of PDX. As a result, their absence at the crash site reportedly made it difficult for emergency first responders to determine how many passengers had been on the airplane and how many had survived the accident. **(Next Slide)**

## Evolution of CRM/SRM

- **Origins 1979 NASA Workshop**
- **1981 UAL Focus on Leadership**
- **1986 Crew Resource Management**
- **Early 90's specificity to flight crews**
- **Mid 90's AQP**
- **2000 – Present Normalization of Error**

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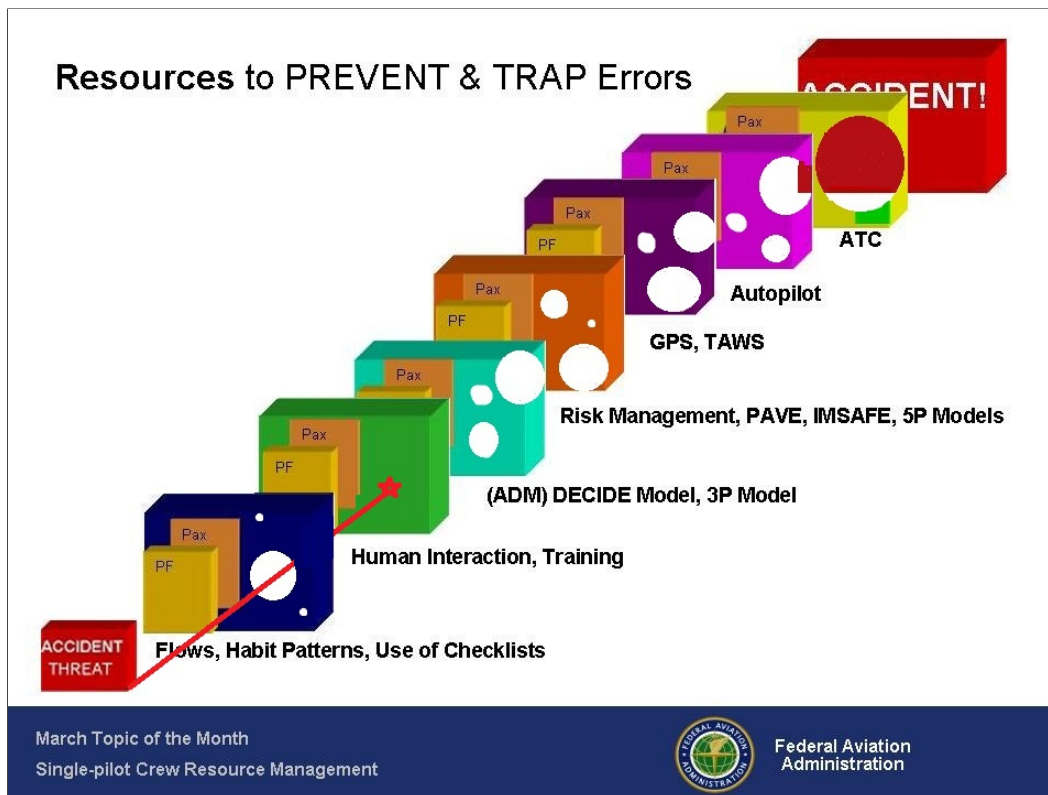


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CRM's roots come from a 1979 workshop by NASA titled: "Resource Management on the Flight Deck." Identified the human error aspects of the majority of air crashes: **Failures of interpersonal communications, decision making, and leadership.** Workshop singled out UAL 173 Captain in his failure to accept input from junior crewmembers and lack of assertiveness by FE. **1<sup>st</sup> Gen: 1981 (Click)** FRM now Cockpit RM, was initiated by UAL. Focus on psychological testing and general leadership. Many airlines adopted a form of CRM and employed games and exercises unrelated to aviation to illustrate concepts. Pilots denounced courses as "charm school" or attempts to manipulate their personalities. **2<sup>nd</sup> Gen: 1986 (Click)** Cockpit RM now Crew RM with more specific concepts related to flight operations. CRM became more team oriented. Criticisms remained that training was heavily laced with "psycho-babble" ex: 'synergy' in group dynamics was condemned by participants as representative of irrelevant jargon. **3<sup>rd</sup> Gen: Early 1990's (Click)** Greater specificity in training for flight crews, CRM extended to flight attendants, dispatchers, and maintenance. A number of carriers also developed specialized CRM training for new captains to focus on the leadership role that accompanies command UAL's CLT. **4<sup>th</sup> Gen: Mid 1990's (Click)** Advanced Qualification Program **5<sup>th</sup> Gen: 2000-Present (Click)** Human error is ubiquitous and inevitable. If error is inevitable, CRM –SRM can be seen as a set of error countermeasures: Trapping and Mitigating the consequences of those errors which occur and are not trapped. CRM is not and never will be the mechanism to eliminate error and assure safety in high risk endeavors, such as aviation. Error is an inevitable result of the natural limitations of human performance and the function of complex systems. CRM is now one of an array of tools that organizations can use to manage error. Now, let's take a look at some of the resources available to prevent and trap errors. **(Next Slide)**



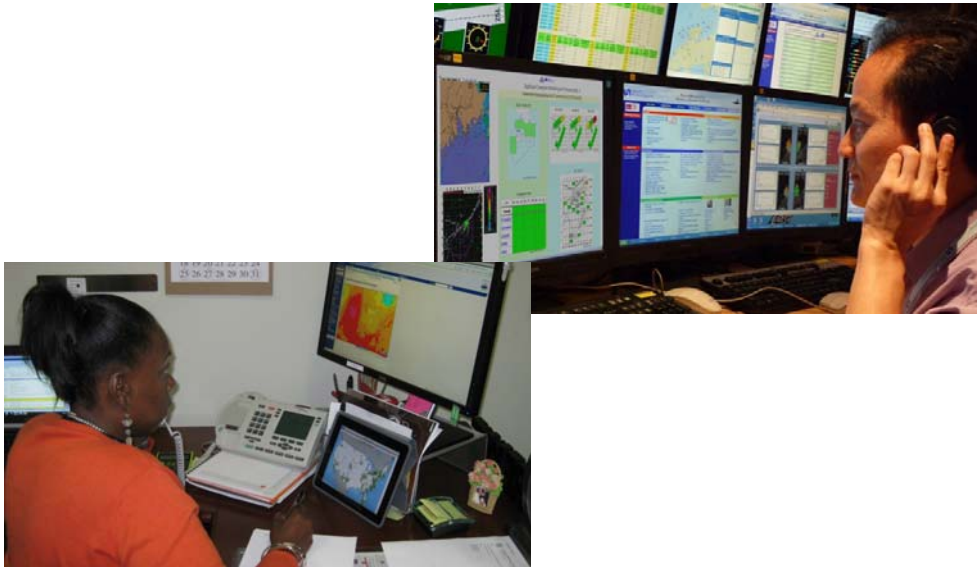


These are resources that could be used for example during a go-around to catch errors and prevent an accident. **ATC, Autopilot, Automation, GPS, and TAWS, Risk Management, ADM. Human Interaction, Training, Flows, Habits Patterns, and Use of Checklists.** These resources are barriers blocking the chain of events that can lead to an accident. These resources can help stop an accident threat (**Click**) from becoming an accident. Realistically, this is how the resources appear: (**Click**). Threats which arise are blocked by the number of resources, and the integrity of each of them individually. (**Click**) An accident threat may or may not penetrate resources which are lacking integrity. What can happen if the geometry of the threat is modified? (**Click**) What if that same threat is facing greater integrity? (**Click**).

PAVE=Pilot, Aircraft, enVironment, External Pressures. IMSAFE=Illness - Is the pilot suffering from any illness or symptom of an illness which might affect them in flight, Medication - Is the pilot currently taking any drugs (prescription or over-the-counter), Stress - Psychological or emotional factors which might affect performance, Consider alcohol consumption within the last 8 to 24 hours, Fatigue - Has the pilot had sufficient sleep and rest in the recent past, and Eating - Is the pilot sufficiently nourished? Some sources give Emotion. **5 Ps=Plan, Plane, Pilot, Passengers, Programming.**

**ADM DECIDE model=Detect, Estimate, Choose, Identify, Do, Evaluate: 3P Model=Perceive** the given set of circumstances for a flight. **Process** by evaluating their impact on flight safety. **Perform** by implementing the best course of action, or similar process when making critical decisions that will have an effect on the outcome of the flight. pilots exercise the 3P process continuously, while the DECIDE model and naturalistic decision-making result from the 3P process.

# Preflight Resources



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General Aviation Single-pilot operations offer many opportunities for resource management but most of the human resources aren't in the airplane with you.

As you complete your flight planning , a call to Flight Service will get you the latest weather and operational information including TFR's. Many pilots use this call to confirm the information they've already accessed on line. And a route briefing just before takeoff will attest to the fact that you have the latest TFR information.

In the air those same specialists are available for consultation. They're just a radio call away.

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# Passengers



- **Set Pax. Expectations**
  - Preflight brief
  - Safety items
  - Sterile cockpit
- **Give them jobs to do**
  - Traffic lookout
  - Chart holder
  - Checklist reader
  - Zoo keeper

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Passengers can go a couple of ways: They can, and will if you let them, distract you from your piloting; or they can be a valuable part of the crew. **(Click)**

Set passenger expectations before you start engines. Give them a synopsis of the flight route and what they'll see and hear. **(Click)**

Cover the standard safety items such as restraints, smoking, & egress. **(Click)**

And we suggest a sterile cockpit for taxi, takeoff, climb, descent, & landing. **(Click)**

Give them jobs to do.

Traffic spotting assistance is always appreciated. We know of one pilot who pays his kids a buck for each target they spot before he does. The last we checked, he's into them for more than a hundred. Passengers can also be chart holders and, with training & supervision, checklist readers. If family pets are carried they should also be assigned zoo keeper duties.

All of these things make the time pass more quickly and increase the safety and enjoyment of flight. **(Next Slide)**



# In-flight Resources



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You may be piloting a plane with the latest glass cockpit equipment that displays traffic and weather. But you might be flying older technology aircraft with a mobile device for navigation and weather data assistance. Either way it's nice to confirm what you're seeing with weather specialists or controllers on the ground.

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## Tablet Apps



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There are a host of tablet-based aviation apps available these days and many pilots are using them. Be sure you're thoroughly familiar with your app of choice and that you have the latest information uploaded before flight.

What do you think may be one of the problems with using apps in the cockpit?  
Pitfalls?

We suggest an alternate power supply to guard against dark screens when you need them most.

Here's a couple of additional tips:

Practice with your device on the ground before flying with it. Find out where best to locate it and practice all in-flight app functions while scanning for traffic.

Don't let the app distract you from important flying tasks and, even though your app depicts all airspace boundaries; give yourself some room. Fly at least 2 miles outside all airspace you don't have clearance to enter. When it comes to pilot deviations, ATC radar trumps i-pad every time.

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## •Autopilot systems



- AP Maintenance
- Practice w/all modes & functions
- Don't neglect hand flying skills

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Finally – many GA aircraft are equipped with autopilot systems. These valuable crew members can take care of basic wing leveling and, in many cases, navigation tasks while you're attending to other matters but you have to know how to use them: **(Click)**

Make sure your autopilot system is properly maintained and functions properly. **(Click)**

Practice using the autopilot in all modes and functions. **(Click)**

Don't neglect your hand flying skills. They deteriorate quickly. Many pilots recommend hand flying alternating between hand flown and autopilot approaches. We recommend 2 hand flown approaches for each autopilot approach.

**(Next Slide)**

## References

- **Aviation Risk Management Handbook– Chapter Six**  
[faa.gov](http://faa.gov)
- **Article – *Managing Yourself* – Flight Training Magazine December 2000**  
[flightraining.aopa.org](http://flightraining.aopa.org)



Here are a couple of references you might find helpful. FAA dot gov and Flight Training dot AOPA dot org

## Questions?

Portland FSDO  
3180 NW 229th Avenue  
Hillsboro, Oregon 97124

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(800) 847-3806 Fax: (503) 615-3300

Office Hours: 7:30 a.m. to 4:00 p.m.,  
Monday - Friday

Office visits appointments only  
recommended



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**Presentation Note:** *You may wish to provide your contact information and main FSDO phone number here. Modify with Your information or leave blank. (Next Slide)*

Break  
10  
Minutes Remaining

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