



# CRM for the Single Pilot

At first glance crew resource management (CRM) for the single pilot might seem a paradox, just like 'fighting for peace' or 'a well-known secret agent' – but it is not.

While multi-pilot operations have traditionally been the focus of CRM training, many elements are applicable to the single pilot operation. In fact, many CRM practical skills are really just extensions of airmanship and human factors training.

## Where Did CRM Come From?

CRM is now a key element in airline operations, but only 30 years ago it was a completely new concept.

In the 1970s, a number of airline hull losses in Europe and the United States led to the conception and introduction of CRM in airlines. NASA research showed human factors failures were involved in a large number of US jet transport accidents, particularly in the skill areas of:

- decision making,
- leadership,
- pilot judgement,
- communication, and
- crew coordination.

Lumping it all together as 'pilot error' was no longer acceptable.

## What is CRM?

In a nutshell, CRM is the effective management of all resources available to the pilot to complete a safe and efficient flight. CRM has historically concentrated on management skills for pilots, and while it has focussed on a variety of skill sets through the years, the basic principles have remained the same.

Training courses typically include: communication and interpersonal skills, situation awareness, problem solving,

decision making and judgement, leadership and 'followership', stress management, and critique. In recent years the introduction of threat and error management has been added to this list.

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## CRM for the Single Pilot

While some of the topics involved in a CRM course, such as leadership and followership, and inter-crew communication, are not relevant for the single pilot, other elements, such as threat and error management, decision making, and planning, take on additional importance when there is no other crew member to work with.

The most common factors in general aviation accidents and incidents are poor judgement and poor decision making. Adapting CRM for the single pilot can give pilots the tools they need to apply good judgement and improve their decision making skills, as it has done in the airline sector.

The critical lesson in CRM is to use all of the resources around you. Operating

single pilot may make you feel on your own, but in fact there are plenty of resources at your disposal. The most obvious, and unfortunately most underused, is air traffic control. If you have a problem, let them know – they can't help if they don't know. And if they don't know, they may end up contributing to the problem.

You are never alone, even if it's just you in the aircraft. Use *all* available resources. Seek help from whoever you can contact: ATC, other aircraft, ground staff, passengers, company operations.

## Practical Things You Can Do

Every day you fly, you can apply CRM practices – here are some things to get you started.

### Communication

Keep people who need to know, in the loop. Updating your passengers or other non-flying crew members during normal and abnormal operations will lead to an improved information flow. You may need that critical piece of information they have.

When there is no second pilot to confirm the altitude restriction you copied, or the heading to turn onto, make sure you clarify whatever you need to with ATC.

Be alert to the fact that communication suffers when you are busy, tired,

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distracted, interrupted, and more importantly when the information you are receiving does not fit with your pre-conceived ideas.

## Maintain Standards

Standard Operating Procedures (SOPs) are a critical part of any airline operation and an important tool for identifying and trapping errors. Every organisation will have SOPs in some form and it is your responsibility to be familiar with them and then comply with them. A lot of care, consideration and experience has gone into the development of SOPs, but they are not infallible, so if you do have an issue with any SOP, take it up with the organisation, don't just adapt it to suit yourself.

An important part of SOPs are checklists. As a single-pilot operation you are reliant on checklists to replace the 'challenge and response' element of a crew environment, so checklist discipline is critical. Just as important is the time at which you execute a particular checklist. Take some time to consider and develop some cues for when you would carry out particular checklists, and challenge yourself to use the checklist properly every time.

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Maintaining and promoting a healthy safety culture within your organisation is everyone's responsibility. Make a conscious effort to do this by setting a good example and freely sharing information.

## Health

Incapacitation procedures are well practiced in the airlines, but single pilot, you have to be your own backup. Consequently, you must firstly take good care of yourself and secondly make sure you are fit to fly. Using the "I'M SAFE" checklist is a good idea.

While in flight, if you feel unwell, do not press on, get on the ground at the nearest suitable airfield and make use of all the available assistance. The single biggest cause of pilot incapacitation is gastroenteritis, and that can happen

to anyone, at any time. SOP for pilot incapacitation in airlines is to declare an emergency. Engage the autopilot, if you have one, and declare an emergency.

## Workload Management

This is the most important element of single-pilot CRM. You can only process a certain amount of information at one time, so being aware of your workload and preserving some mental capacity is important, but even more important is being well prepared.

Know your aircraft – what are the system failure indications, what are normal operating parameters, what are the emergency drills you must know off by heart? Spend time thinking about the 'what if' scenarios. Then, when 'what if' becomes 'right now' you have already considered what you will do.

Take the time to become familiar with every aspect of your operation. A thorough planning session and pre-flight briefing will go a long way towards eliminating any surprises. You should aim to have a good understanding of: the weather conditions en route, at destination and at the diversion airfield, ground and departure procedures, flight routing, aircraft serviceability, and arrival procedures.

Be completely familiar with how the autopilot and other automation devices (like the GPS) work. Practice getting to the information you need so that you are not distracted during critical phases of flight. Understand their limitations and then use them as much as practicable.



## Situational Awareness

Just as important as workload management, is maintaining excellent situational awareness. You should be constantly updating your mental picture with all the new information you receive. Situational awareness is particularly important during the departure, approach, and landing phases. Controlled Flight Into Terrain (CFIT) accidents tend to occur because of a loss of situational awareness in these phases.

*The critical lesson in CRM is to use all of the resources around you.*

## Threat and Error Management

This is a relatively new development in the CRM suite of skills, but is proving to work well operationally. Some research suggests that crews should expect at least one threat per flight. Aviation is an environment filled with threats.

Threat management aims to identify the potential threats to your operation, and to manage them so that they do not impact negatively on your flight. Some threats can be anticipated, others will happen without warning.

Take some time before the flight to consider the particular threats you may face on today's flight. The most common threats to the safe operation of a flight are:

- adverse weather,
- ATC,
- environmental operational pressures,
- aircraft malfunctions, and
- airline operational pressures.

Of these, the ATC threats are the ones most likely to be mismanaged.

For example, if you know that at a particular airport ATC could give you a late change to your departure, you should identify that as a threat. You can then choose to brief the alternative departure as well as the cleared one, so that you are prepared for the change if it comes.

Pilots make errors. We may never be able to eliminate errors completely from the aviation system – it is, after all, run

by people, but we must be able to admit those errors, manage them, and above all learn from them.

Being completely familiar with your aircraft, and your operation, enables you to trap errors before they become significant.

One key strategy you might like to try is to identify times when errors are most likely to occur, such as during times of high workload. Isolate the type of errors you are likely to make and then develop and implement a safety procedure to increase your chances of either avoiding or catching those errors.

## Decision Making

If an emergency or an abnormal situation does occur, be prepared for the 'startle reflex', and don't let it rush you into a decision. The startle reflex is a normal and instantaneous reaction as the brain absorbs information about an emotionally significant event, before we are aware of it ourselves. It often shows up as shock or disbelief.

There are only a few situations in which you have to act immediately, and your actions in those cases should be second nature, but in all cases *fly the aircraft*. Otherwise take time, *while making sure you fly the aircraft*, to make a proper diagnosis, take the appropriate actions, *while flying the aircraft*, and then at an appropriate time evaluate the information you received and the actions you took, to make sure your decisions were correct.

Here is one decision making model you might like to try:

D	Detect the fact that a change has occurred
E	Estimate the need to counter or react to the change
C	Choose a desirable outcome for the success of the flight
I	Identify actions which could successfully control the change
D	Do the necessary action to adapt to the change
E	Evaluate the effect of the action

## CRM for the PPL

Just because you are a PPL does not exclude you from the responsibility of knowing about, and putting into practice, the principles of Crew Resource Management. In fact, the recently revised PPL and CPL human factors syllabuses include stress management, situational awareness, judgement and decision making, social psychology, flight deck management, threat and error management, culture, and documents and procedures, as separate topics.

## Self Assessment

Operating as a single pilot means you do not have the benefit of feedback from another crew member – therefore, you need to learn from your own experiences. Having said that, there is no way you are going to make all the mistakes possible, so make sure you take every opportunity to learn from other people's mistakes.

An important element of the CRM programme is a reporting system – a way to learn from the experiences of others. Does your organisation have a reporting system or a feedback loop? ■

## More Information

 *Aircraft Human Performance Limitations: notes on the human performance and limitations syllabuses for the private and commercial pilot licences.* Wilson.

 *Air Pilot's Manual Series Volume 6 (Human Factors & Pilot Performance).* Trevor Thom.

 *Human Factors for the Professional Pilot.* Trevor Thom.

 *Human Factors for General Aviation.* Trollip & Jensen.

 *Human Factors for Pilots.* Green, Muir, James, Gradwell and Green.

 UK CAP737 *Crew Resource Management (CRM) Training.* <http://www.caa.co.uk/cap737>

 Advisory Circular 91-11 *Single Pilot IFR.* [www.caa.govt.nz/rules/ACs.htm](http://www.caa.govt.nz/rules/ACs.htm)