

# **MIDAIR COLLISION AVOIDANCE (MACA)**



## **PILOT CONTROLLER LIAISON PAMPHLET**

# **MARCH AIR RESERVE BASE CALIFORNIA**

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Fellow Pilots,

Southern California is noted for many things. One of them, unfortunately, is the potential for a midair collision due to the heavily congested airspace. This part of the country is one of the most hazardous areas in the world for aircraft. In order to reduce the risk of a major accident, know your personal limitations, learn as much as possible about the airspace system you operate in and know the flight characteristics of the aircraft around you.

This pamphlet was developed in the interest of promoting flight safety. It details factors affecting vision, collision avoidance techniques and March ARB aircraft and their departure/approach routes. Hopefully this information will assist you in avoiding situations where the potential for a midair collision is the greatest.

**FLY SAFE!**

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# Who represents this pamphlet's audience?

This pamphlet is intended for both March ARB and non-March ARB users. Below are data and images for the most common aircraft at each airfield.

## March ARB (KRIV) aircraft users

### Air Force Reserve & California Air National Guard

Aircraft	Max Altitude	Max Speed	TCAS equip
KC-135	50,000' MSL	460 kts	Yes
C-17	45,000' MSL	450 kts	Yes
F-16	50,000' MSL	1,303 kts	No

KC-135



C-17



F-16



### US Customs and Border Protection

Aircraft	Max Altitude	Max Speed	TCAS equip
PC-12	25,000' MSL	200 kts	Yes
AS-350	15,000' MSL	150 kts	Yes

### Aero Club

Aircraft	Max Altitude	Max Speed	TCAS equip
C-172/T-41	13,000' MSL	120 kts	No
T-34	18,000' MSL	190 kts	No
C-182	16,500' MSL	148 kts	No

CBP AS-350



T-34



C-182



## Non-March ARB aircraft users

Below lists common aircraft types that frequent airports near March ARB.

### Riverside Municipal (KRAL)

Aircraft	Max Altitude	Max Speed
Cessna 172	14,000' MSL	120 kts
Piper Cherokee	14,300' MSL	120 kts
Robinson R22 Helo	14,000' MSL	100 kts

C-172



Pa-28



R-22



### Perris Valley (L65)

Aircraft	Max Altitude	Max Speed
DHC- 6 Twin Otter	26,700' MSL	170 kts
Shorts Skyvan	22,000' MSL	200 kts
Pilatus Porter	20,500' MSL	150 kts

DHC-6 Twin Otter



SC-7 Skyvan



PC-6 Porter



### Flabob (KRIR) / French Valley (F70)

Aircraft	Max Altitude	Max Speed
Cessna 152	14,700' MSL	109 kts
Beechcraft Bonanza	16,500' MSL	179 kts
Ultralight (General)	12,500' MSL	90 kts

C-152



Bonanza



Ultralight



# Identifying/mitigating hazards

## 1. Midair collision avoidance

During a three-year study of midair collisions (a.k.a. midairs) involving civilian aircraft, the National Transportation Safety Board (NTSB) determined that:

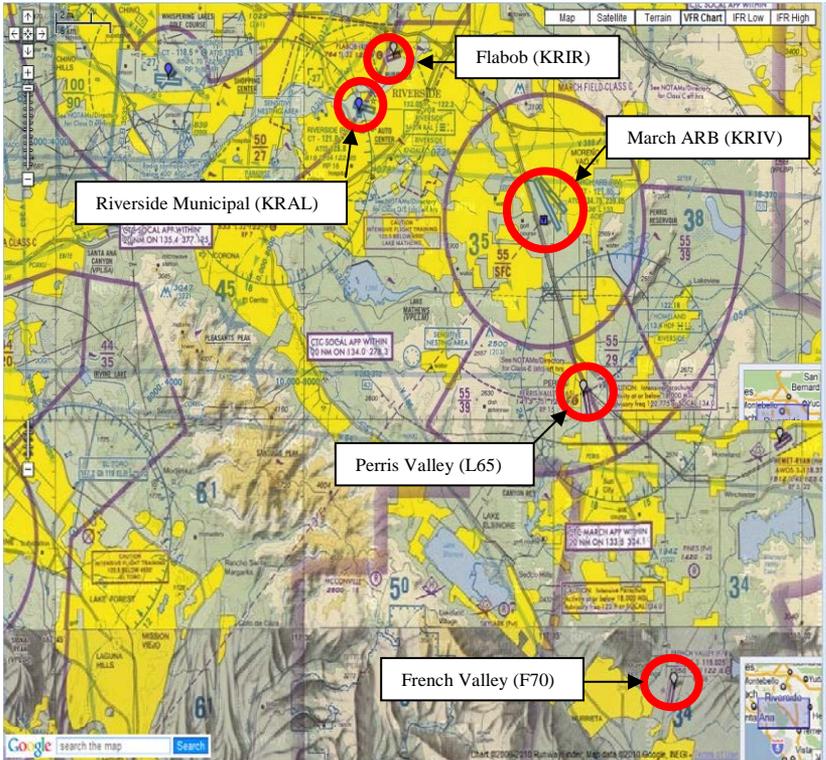
- a. Occupants of most midairs were on a pleasure flight with no flight plan filed.
- b. Nearly all midairs occurred in VFR conditions during weekend daylight hours.
- c. The majority of midairs were the result of a faster aircraft overtaking and hitting a slower aircraft.
- d. No pilot is immune. Experience levels in the study ranged from initial solo to the 15,000 hour veteran.
- e. The vast majority of midairs occurred at uncontrolled airports below 3,000'.
- f. En route midairs occurred below 8,000' and within 25 miles of the airport.
- g. Flight instructors were onboard one of the aircraft in 37% of the midairs.

Mitigation techniques:

- a. **PLAN AHEAD** - Check NOTAMs, deconflict flight route from special use airspace (SUAS) and military training routes (MTRs).
- b. **SEE AND AVOID** - Scan the airspace ahead and to the side. Periodically scan behind as well, since the majority of midairs occur with one aircraft overtaking another.
- c. **CLEAR** - Before executing a climb, turn, descent or any other maneuver, ensure the area is clear.
- d. **COMMUNICATE** - Broadcast your position and intentions when flying to/from uncontrolled airports. Request and use available RADAR services; however, you are ultimately responsible for seeing and avoiding other traffic.
- e. **SQUAWK** - Turn it on (if equipped) and adjust to reply on Mode 3/A and C. Without Mode 3/A, TCAS is ineffective. Without Mode C, TCAS effectiveness is greatly reduced.
- f. **BE SEEN** - Turn on anti-collision or other appropriate lights whenever your engine(s) are running. Also, turn on your landing lights when operating below 10,000' MSL, day or night (especially within 10 miles of an airport) or in areas of reduced visibility.

## 2. Congested airspace

March ARB lies within Class C airspace. There are four other airports adjacent to the March ARB Class C airspace you should be aware of. These airports include: Riverside Municipal (KRAL), Perris Valley (L65), French Valley (F70) and Flabob (KRIR). The aircraft breakdowns at these airports are listed on Page 5.



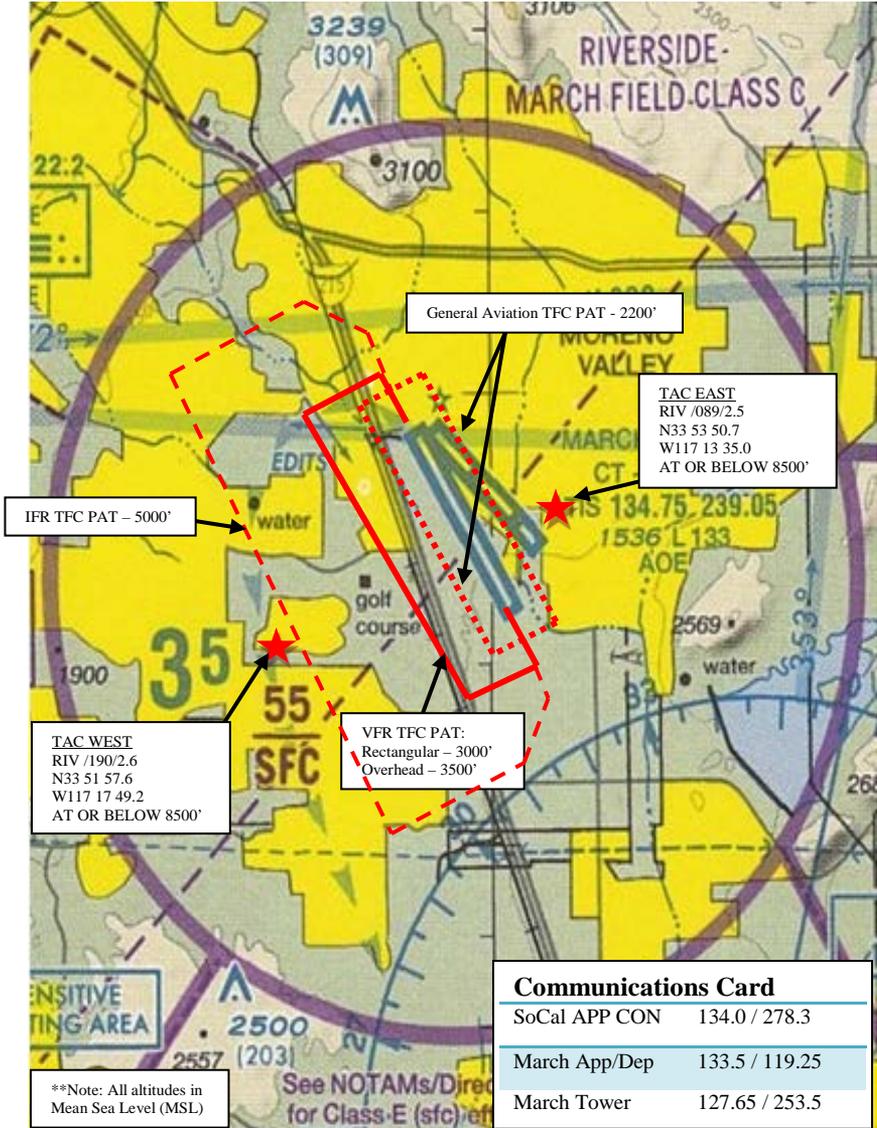
Mitigation techniques:

March ARB Air Traffic Control (ATC) is responsible to provide Class C airspace services at and below 4,000 MSL in the northern inner core as well as at and below 5,000 MSL in the remaining Class C airspace. It is mandatory for all aircraft to establish two-way radio communication by contacting March ARB ATC on 119.25 or 284.0 prior to entering the Class C airspace. Southern California TRACON (SoCal) provides aircraft separation services above the Class C airspace.

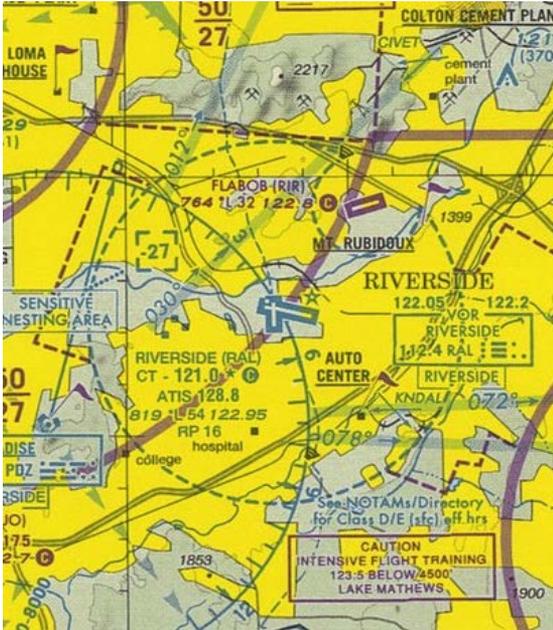
There are 683 General Aviation (GA) and 24 military aircraft associated at these airports. Though the March ARB Class C airspace provides aircraft deconfliction by March ARB, the risk for a midair collision increases once you leave its confines. Mitigating this risk is achieved by knowing the typical traffic patterns and the aircraft breakdowns at these adjacent airports.

March ARB Key Points:

- Transient heavies include the C-5, A330, MD-11, B-747, B-777 and others.
- Other aircraft utilizing March's services include Navy King Airs, Army and Guard helicopters, Department of Forestry S2, police and other law enforcement aircraft.
- The VFR pattern can be used up to 11,000' MSL for fighter aircraft.
- Numerous radar approaches to RWY 32 end in a circling maneuver.



Riverside Municipal (KRAL) - <https://www.riversideca.gov/airport>



<b>Communication Card</b>	
SoCal APP CON	135.4 / 377.125
Tower	121.0 (CTAF)
UNICOM	122.95

<b>Based GA Aircraft</b>	
Single-engine	138
Multi-engine	20
Jets	2
Helicopters	3

<b>Traffic Pattern Altitude</b>	
Rotocraft	1300' MSL
Fixed Wing	1819' MSL
Turbine Acft	2319' MSL

Perris Valley (L65) - <http://www.skydiveperris.com>



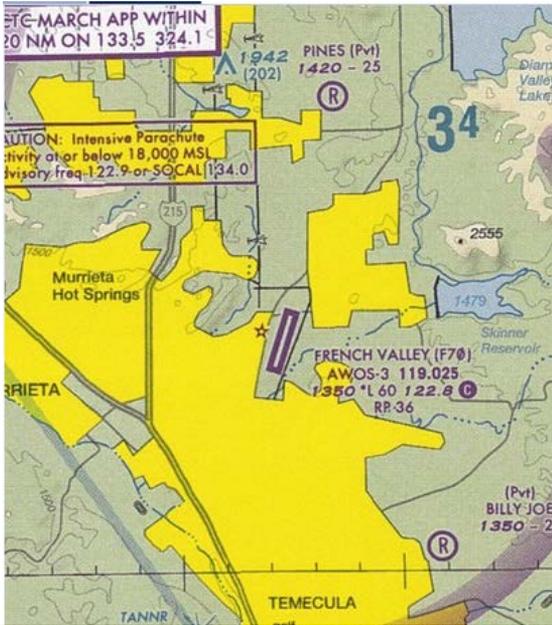
<b>Communication Card</b>	
CTAF	122.9

<b>Based GA Aircraft</b>	
Single-engine	4
Multi-engine	5
Jets	1
Ultralights	125

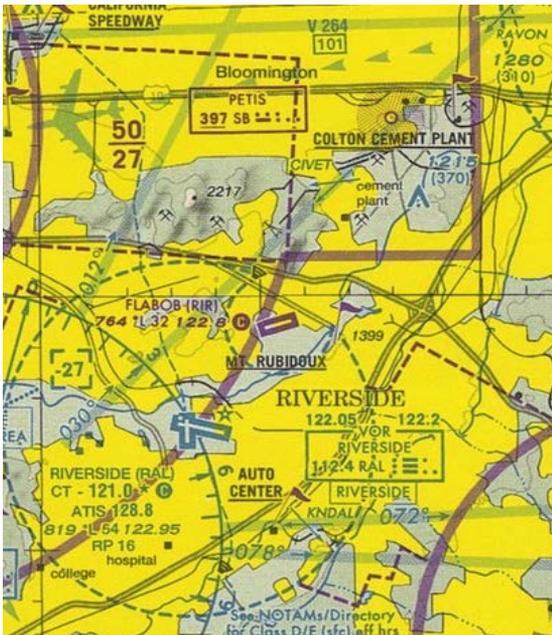
<b>Traffic Pattern Altitude</b>	
Fixed Wing	2413' MSL

IFR Clearance: March GCA  
 (951) 655-2355  
 Between 2300L and 0700L  
 SOCAL App: 800-448-3724

French Valley (F70) - <http://www.rcfva.com>



Flabob (KRIR) - <http://www.flabobairport.org>

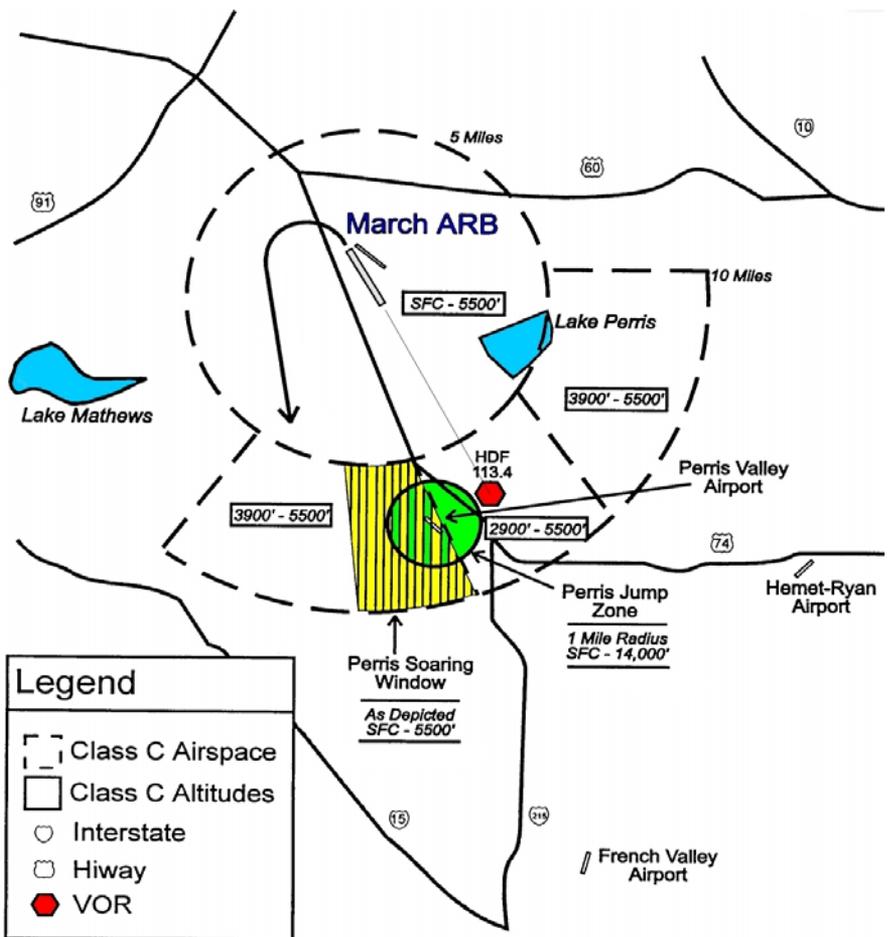


### 3. Perris parachute drop zone

The west coast's largest fleet of skydiving aircraft is located at Perris Valley airport. The majority of parachute jumps happen on weekends between sunrise and sunset. Be aware operations can occur up to 18,000' MSL!

Mitigation techniques:

Though March ATC primarily deconflicts aircraft between March ARB and Perris Valley, it is critical that every pilot remain vigilant when operating within this airspace. If you have an available radio, you can monitor operations on Perris Valley's advisory frequency (122.775), where you will hear pilots communicate with ground personnel or contact March GCA (119.25) below 5,000 and SoCal (134.0) when above 5,000 MSL.

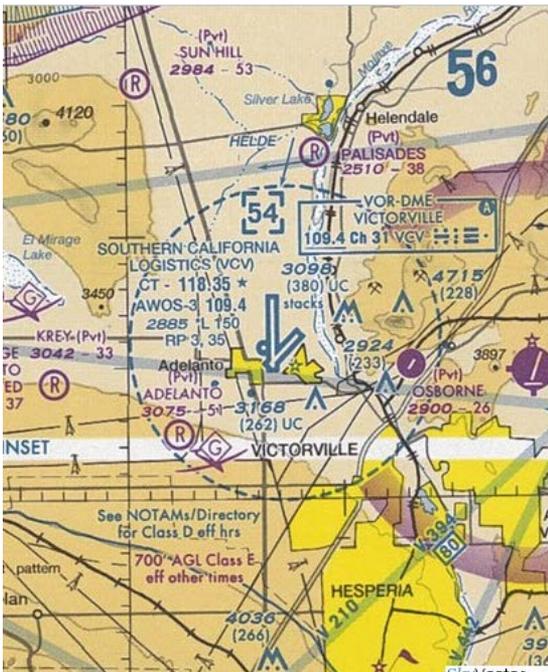


## 4. Remotely Piloted Aircraft at Southern California Logistics Airport (KVCV)

The 163rd Reconnaissance Wing, California Air National Guard tenant at March ARB, conducts unmanned MQ-9 Reaper launch and recovery operations at the Southern California Logistics Airport (KVCV) in Victorville, CA. One unique function to MQ-9 operations is the GA single-engine chase ship involved whenever the aircraft is departing or arriving at the airfield. The chase ship is not required for traffic pattern operations under tower control; however, it may still be present under certain conditions. It will accompany the MQ-9 during any operations between R-2508 and KVCV below FL180. The MQ-9 operates at the same traffic pattern altitude as fixed wing aircraft and only while tower is open. The majority of flying occurs Monday through Friday and the FAA currently limits operations from sunrise to sunset with no more than one MQ-9 in the traffic pattern.

Mitigation techniques:

It is recommended to always contact Joshua and squawk IFF mode 3/A and C when transiting the airspace in the vicinity of KVCV and Edwards AFB. Also, be sure to clear for both the MQ-9 and its chase ship. The chase ship will trail the MQ-9 within 2 nm, 1,000 ft. and squawk a different transponder code. The MQ-9 normally transitions to the R-2508 airspace at 8,500 MSL northbound, and returns to KVCV at 9,500 MSL southbound while maintaining contact with Joshua and KVCV Tower.



Communication Card	
Joshua APP	124.55 / 363.0
Tower	<b>118.35</b>
<b>**Tower hours: 0600-2000L</b>	

Traffic Pattern Altitude	
Fixed Wing	3885' MSL

## Frequently asked questions

1. How do I report a near midair collision?

If you find yourself in a near midair collision, it is imperative to first continue flying the aircraft! Notify ATC as appropriate (i.e., if you had to maneuver in response to a TCAS resolution advisory). Once you are in a safe position, be sure to document as much information as possible. Key items include: location, altitude, weather conditions, aircraft call signs and types, as well as the ATC agency. Upon landing, fill out an AF Form 651 (<http://www.e-publishing.af.mil/>) and turn it into the 452d Air Mobility Wing Flight Safety Office (951-655-4481 / [452amw.se@us.af.mil](mailto:452amw.se@us.af.mil)).

2. When is the majority of flying by March ARB aircraft conducted?

Operations normally occur 0700-2300L, Monday through Sunday.

3. What/where is the highest potential of being involved in a midair collision with March ARB aircraft?

Radar base to final for Rwy 32 is the area with the highest amount of traffic conflicts. The frequency of near midairs along the recovery routing to Rwy 32 is greater than any other area in the March ARB airspace.

4. Where should GA aircraft fly to avoid March ARB aircraft?

Avoiding high traffic areas, such as final for Rwy 32, will decrease the possibility of a midair greatly. Also, although nearby MOAs are not restricted from civilian VFR traffic, they should be avoided when active (weekdays and some Saturdays) to minimize midair potential.

5. What are the best ways to see an aircraft to avoid a midair collision?

The best way to see and avoid any aircraft is to use a proper scan pattern backed up by properly squawking your assigned transponder code to allow TCAS-equipped aircraft to see you. One scanning technique is to start at one side of the wind screen and allow your eyes to focus every 10-15 degrees. Remember to search above and below the horizon. Traffic conflicts often occur while one aircraft is transiting the flight path of another. You can also detect other aircraft by communicating with ATC. If traveling near March ARB airspace, contact "March GCA" on 133.5 / 119.25.

# ATTACHMENT 1

## Glossary of references and supporting information

### *References*

AFI 91-202, The US Air Force Mishap Prevention Program,

AC 90-48C, Pilots' Role in Collision Avoidance

### *Abbreviations and Acronyms*

AF – Air Force

AFB – Air Force Base

AOPA – Aircraft Owners and Pilots Association

APP – Approach

ARB – Air Reserve Base

ARTCC – Air Route Traffic Control Center

ATC – Air Traffic Control

DEP – Departure

FDC – Flight Data Center

GA – General Aviation

L – Local time

MACA – Midair Collision Avoidance

MTR – Military Training Route

RWY – Runway

SUAS – Special Use Airspace

TAC – Tactical

TCAS – Traffic Collision Avoidance System

TFC PAT – Traffic Pattern

TRACON – Terminal Radar Approach Control

TWR – Tower

WX – Weather

### **Prescribed Forms:**

None

### **Adopted Forms:**

None

### **Terms**

None

## ATTACHMENT 2

### Useful web-based MACA resources

There are numerous MACA resources on the internet. Below is a list of web sites listed in a sequential order you can use during your mission planning.

1. **Defense Internet NOTAM Service**: This is an official resource to find airport NOTAMs, TFRs and ARTCC FDC NOTAMs.  
<https://www.notams.jcs.mil>
2. **See and avoid**: This is an official resource established by the Air National Guard Aviation Safety Division in order to combine existing military MACA programs on one web site.  
<http://www.seeandavoid.org>
3. **Aviation safety reporting system**: This is an official resource which uses NASA as a third party between you and the FAA for Aviation Safety Reports. On the web site you can report actual or potential discrepancies involving flight safety with immunity.  
<http://asrs.arc.nasa.gov>
4. **Aviation safety information analysis and sharing (ASIAS) system**: This is an official resource from the FAA serving as a source to integrate, analyze and share aviation safety data and information.  
<http://www.asias.faa.gov>
5. **AC 90-48C**: FAA Advisory Circular covers collision avoidance incorporating human factors and regulations.  
[http://www.faa.gov/regulations\\_policies/advisory\\_circulars/index.cfm/go/document.information/documentID/23090](http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/23090)
6. **Collision Course: Avoiding the Close Encounter**: This 41-minute video can be streamed online from the AOPA Air Safety Foundation web site.  
<http://flightraining.aopa.org/students/maneuvers/courses/index.html>
7. **Collision Avoidance: Strategies and Tactics**: This AOPA ASF Safety Advisor teaches pilots how to visually identify potential collision threats and covers procedures that can lessen the risk of an in-flight collision or runway incursion.  
<http://www.aopa.org/-/media/Files/AOPA/Home/Pilot-Resources/ASI/Safety-Advisors/sa15.pdf>  
<http://www.travis.af.mil/shared/media/document/AFD-070807-045.pdf>
8. **March ARB MACA**: The official website of March ARB has a link to this document.  
<http://www.march.af.mil/>

# ATTACHMENT 3

3/18/83

AC 90-48C  
Appendix 1

## A RADAR FOR ALL SEASONS



### DISTANCE - SPEED - TIME

M P H	SECONDS	
	600	360
10 miles	60	100
6 miles	36	60
5 miles	30	50
4 miles	24	40
3 miles	18	30
2 miles	12	20
1 mile	6	10
1/2 mile	3	5

### CRITICAL SECONDS

Move back 12 feet from this illustration. From that position the silhouettes represent a T-33 aircraft as it would appear to you from the distances indicated in the table on the left. The time required to cover these distances is given in seconds for combined speeds of 360 and 600 mph.

The blocks on the lower left mark the danger area for the speeds quoted, when aircraft are on a collision course. This danger area is based on the recognition and reaction times shown in the table on the lower right.

RECOGNITION  
OF  
DANGER  
(From U.S. Naval Aviator  
Safety Reference)

Excerpt

	Seconds
see object	0.1
recognize a/c	1.0
become aware of collision course	5.0
decision to turn left or right	4.0
muscular reaction	0.4
aircraft lag time	2.0
<b>T O T A L</b>	<b>12.5</b>

## LOOK ALIVE AND LIVE

Page 1 (and 2)

For a full size version of this training aid, see AC 90-48C (link on page 15).