

## Recommended RC Flying Site Specifications

### A. Introduction:

The AMA has determined that most modelers and model clubs are careful in their selection of flying sites, site layout, and operational practices.

The suggested specifications detailed below have been developed to promote improved field management and provide added margins of safety for the ever-increasing numbers of fliers and spectators. Most clubs should be able, with reasonable effort, to comply with this suggested layout for general field arrangement and conditions for sport flying.

The suggested specifications are not mandatory requirements, and compliance with these suggestions does not, of course, guarantee that no accident will occur. The AMA recommends that individual clubs design their flying sites based not only on geographic area available but also on sound sensitivity, obstructions, proximity of neighbors, etc., while incorporating the recommendations presented below. The types of aircraft the site is anticipated to accommodate, such as Giant Scale or small electrics, may effect an increase or decrease of the overfly area. (See FIGURE 2.) When designing or redesigning any flying site the AMA should be contacted with any questions, comments, or concerns regarding specifications, layout, and safety.

The official AMA Safety Code remains the governing factor. All members and clubs should conduct their field operations in accordance with the Code.

### Taxi Area:

No landings or takeoffs from this area.

- Provides additional open space between pilots and aircraft during the time when most out-of-control accidents happen.
- Allows taxi room in front of other pilots with less chance of other frequencies interfering with taxiing aircraft.

### Barrier:

Designed to stop taxiing models from veering into pilots' and/or spectators' positions. (Includes plastic or chainlink fencing, hay bales, shrubbery, etc.)

### Pilot Line:

Set back from runway edge to keep pilots away from aircraft.

### B. Personnel Side of Flight Area:

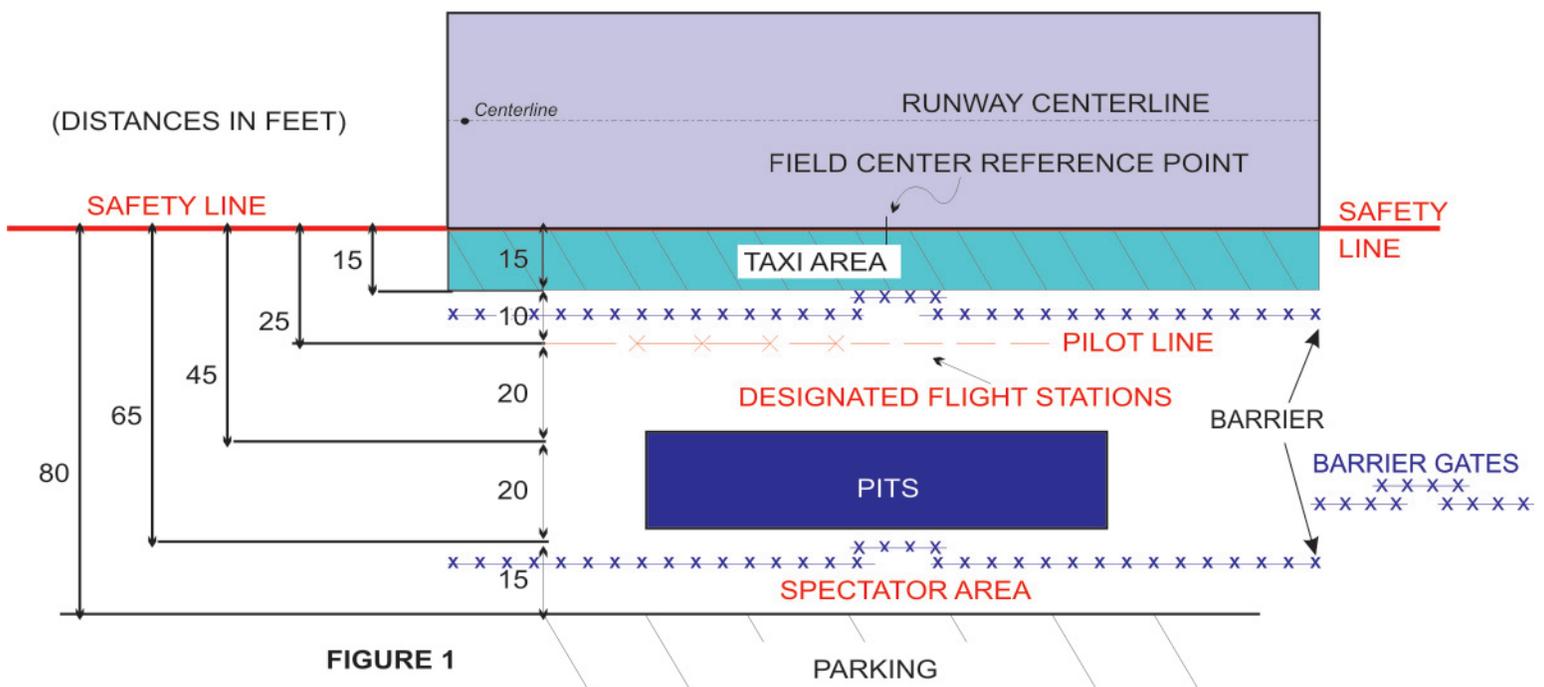
#### Locations

Runway edge is the basic  
 Pilot line a minimum of  
 Pit line a minimum of  
 Spectator line a minimum of  
 Parking lot a minimum of

#### Distance Factor (measured perpendicular from edge at runway safety line)

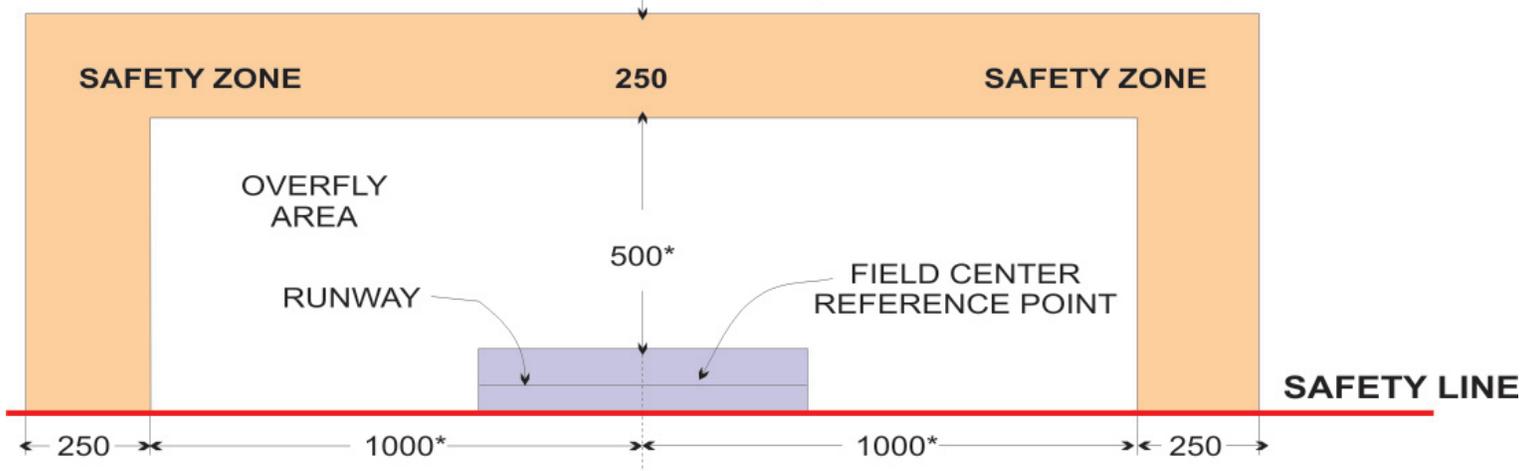
Safety line or 0  
 25 feet from safety line  
 45 feet from safety line  
 65 feet from safety line  
 80 feet from safety line

**Safety Zone:** An additional 250-foot safety zone, added to the OVERFLY AREA, is desirable if any major roads, buildings, or outdoor personnel activities are in the general area or if high-speed or high-performance aircraft are flown.



**FIGURE 2**

(DISTANCES IN FEET)



**C. Flight Sector:**

(Covering a 180° sweep on the flying side of the reference line)

Flight area clear of potential hazards (such as individuals working, playing, or traveling outdoors; buildings having glass surfaces facing the flying area; or a storage facility containing volatile products or compressed gasses) at least 1,000 feet left and right and 500 feet in front of pilot. Most flying is contained within 1,000 feet either end from field center reference point and 500 feet in front of reference point. Field center reference point is shown in FIGURE 1, but is essentially edge of runway at center of field. (See alternate site layouts.)

\*Distances referenced may be increased or decreased according to site usage.

**D. Signs: Minimum Posting Recommendations for Public Notice**

- “Flying Site” (This sign may be incorporated with the field rules but should be the leading words in a larger letter size at the top of the sign. Placement of the sign should be situated so that spectators can easily read it.)
- Field rules
- Current official AMA Safety Code
- “No spectators beyond this point without escort”
- Designated parking area (signs at boundaries)
- Emergency telephone numbers
- GPS coordinates
- Location of nearest hospital or emergency medical facility

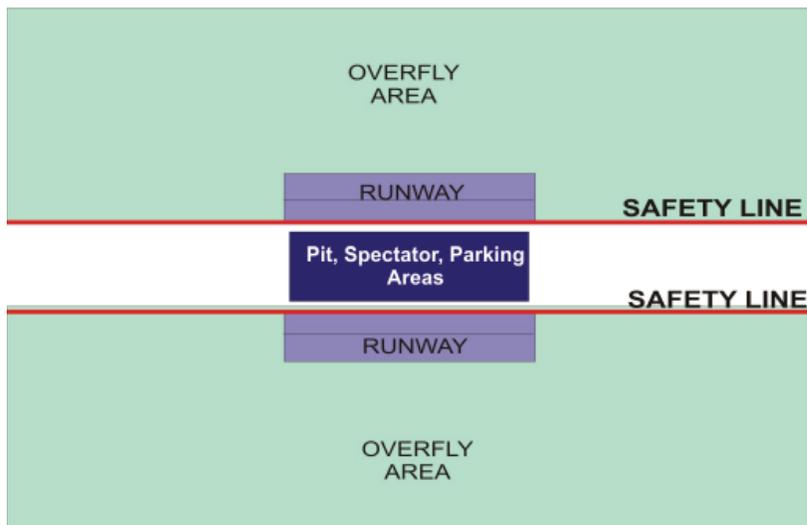
**E. Equipment:**

- Frequency control board
- First-aid kit
- Fire extinguisher with appropriate ratings

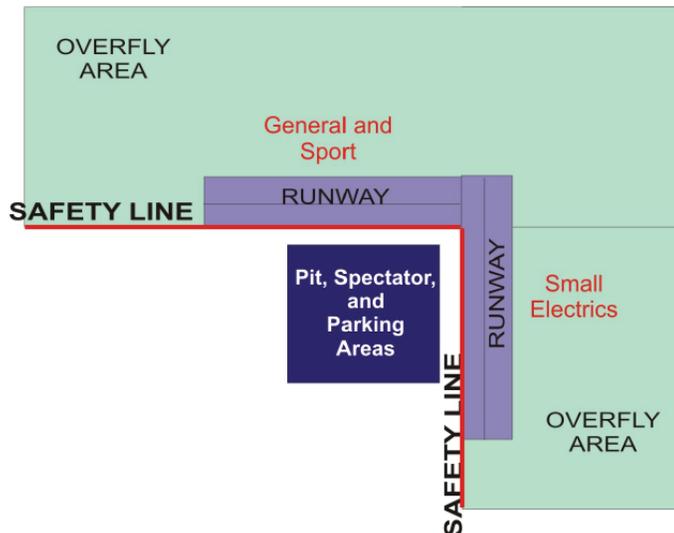
**F. Alternate RC Flying Site Suggestions**

Sites may be configured in various ways to accommodate multiple flying areas for simultaneous use. Care must be taken to fulfill the requirements found in the official AMA Safety Code, including the Specialized Documents. Simplified field layouts are illustrated in the following diagrams. (Not to scale.)

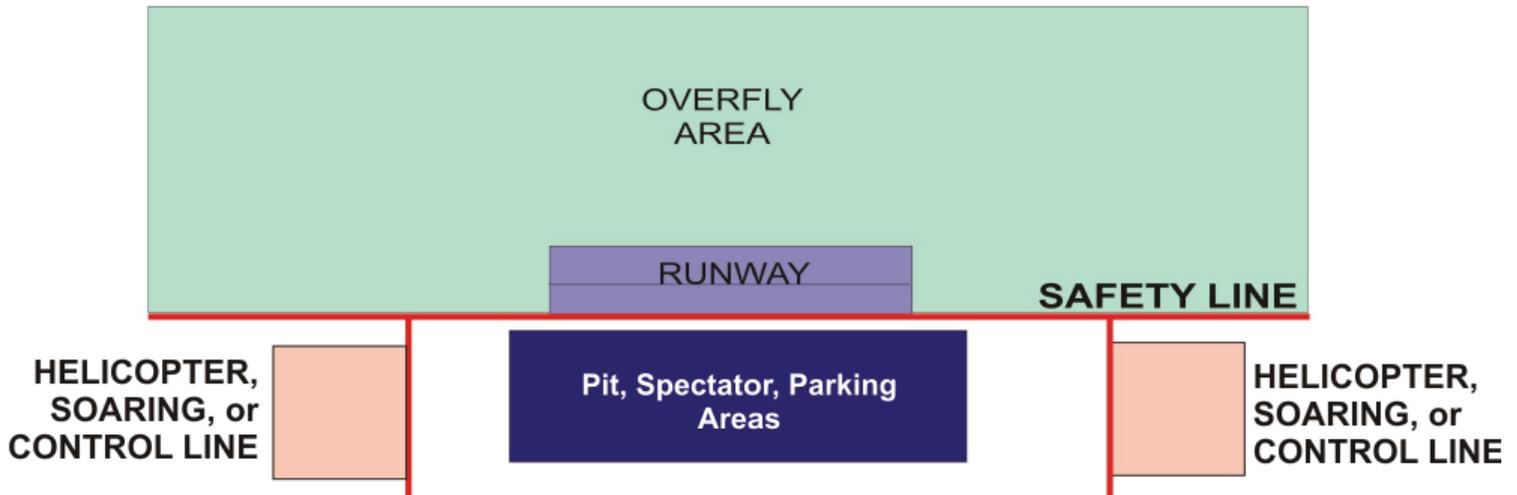
**PARALLEL SITE LAYOUT**



**L SITE LAYOUT**

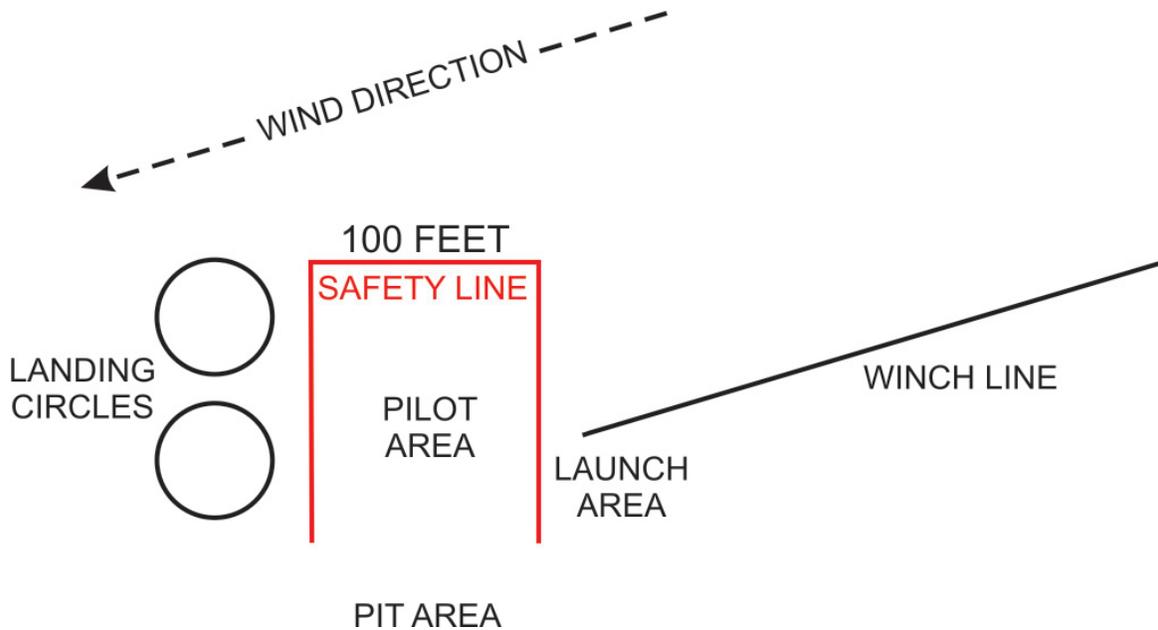


## COMBINATION SITE LAYOUT



Under certain conditions it may be possible to achieve a flying area covering almost 360° as long as care is taken to fulfill Radio Control items 2 and 4 of the official AMA Safety Code. This is especially true for small clubs and general sport flying in rural or low-population-density areas.

## SOARING SITE LAYOUT



### PIT AREA

#### From the Official Academy of Model Aeronautics National Model Aircraft Safety Code

##### Radio Control Section, item 5:

RC model aircraft will not operate within three (3) miles of any preexisting flying site without a frequency-management agreement.

Frequency-management agreement may be an allocation of frequencies for each site, a day-use agreement between sites, or testing which determines that no interference exists. A frequency-management agreement may exist between two or more AMA chartered clubs, AMA clubs and individual AMA members, or individual AMA members. Frequency-management agreements, including an interference test report if the agreement indicates no interference exists, will be signed by all parties and copies provided to AMA Headquarters.

Spread spectrum technology (2.4 GHz) being sold by most RC manufacturers is completely legal for use in all RC categories. Many of the new Ready-to-Fly (RTF) airplane sets are being delivered with these systems. Spread spectrum does not require

keeping track of a specific frequency and will not interfere with systems already in use. Please abide by your local club's frequency-management system.

#### AMA Frequency Management Agreements

##### 1<sup>st</sup> Party

AMA chartered club  
 AMA chartered club  
 AMA chartered club  
 Individual AMA member  
 Individual AMA member

##### 2<sup>nd</sup> Party

AMA chartered club  
 Club not affiliated with AMA  
 Individual AMA member  
 Individual AMA member  
 Individual not affiliated with AMA

There can be more than two parties involved in a Frequency Management Agreement. Be sure to assign the designated frequencies to all parties and inform all involved members (i.e. post the assignments at the flying site). Please note, that only officers of the chartered club can sign the Frequency Management Agreements on behalf of the club.

Note: Once a Frequency Management Agreement is in place it does not have to be renewed on a yearly basis. It is valid until one or both parties (if AMA chartered club) disband, relocate, or sell the property. The agreement is only valid for the specific parties named, which means if a club disbands and another AMA chartered club/individual member uses the flying site, a new Frequency Management Agreement will have to be created, signed by all parties involved, and copies sent to AMA HQ.

Participants in the Frequency Management Agreement are responsible for informing any guest flying at the site about the agreement and enforcing that only frequencies assigned for that particular site are used!

### **Important:**

The Frequency Management Agreement requirement is waived on a provisional basis for club(s) operating exclusively on 2.4 GHz; however, the club will have to submit a 2.4 GHz agreement to AMA.

### *Flying Site Suggestions*

AMA has an extensive package of support materials which, if utilized, can be of help in getting or keeping a flying site. To obtain this material, contact the Flying Site Assistance Coordinator. There is no charge for the materials.

Items in the club assistance program include the “Getting and Keeping Flying Sites” packet and videos that are useful in club presentations in addition to the AMA Safety Code. In any case, local clubs may establish safe flying rules for their sites. These automatically become some part of the AMA Safety Code and must be adhered to.

For help with flying site matters, clubs and individuals should contact the Flying Site Assistance Coordinator at (765) 287-1256, ext. 230, or email [fsac@modelaircraft.org](mailto:fsac@modelaircraft.org).

### *Safety Recommendations*

The majority of model flying that takes place today is recreational rather than within a formal competition framework, and sometimes on publicly accessible sites with little or no formal control. Any accident involving model aircraft may result in property damage and/or bodily injury.

Apart from the direct harm, a less obvious result is the poor image of model flying that results from media coverage of such accidents, which may lead to public antagonism and the loss of flying facilities. It is therefore of the utmost importance that all model fliers observe safety rules.

Safety rules are not an obstacle to the enjoyment of model flying; they help prove that model fliers are the responsible people they proclaim to be. It is not a sign of intelligence to show one’s own skill by flying among or above spectators. It is to his or her personal benefit to make certain that no action on his or her part will result in an accident. It is therefore very important not to fly any model aircraft in competition or in the presence of spectators until it has been proven airworthy by having been flight-tested.

Immediately before each flight, the pilot should verify the model’s condition and proper functioning to ensure a safe and efficient flight. The flier should check for proper fitting and placement of parts, with special attention to engines and propellers. It is imperative that all flying sites, especially Control Line, be situated as far as practical from power lines. For Free Flight aircraft, the starting area must be carefully chosen. Considerations include wind strength and direction, relative position of buildings, runways, vehicle parking, spectator

areas, and the place where models are assumed to land after a normal flight, according to the wind.

### **The following constitute good general safety practices.**

- Never attempt to retrieve a model from electric power lines. Contact the local power company.
- Refrain from using repaired propellers and rotor blades or those that are cracked, nicked, or unbalanced.
- Stay clear of the propeller arc while starting or running any engine or motor.
- Avoid stopping engines by throwing rags or other objects in the propeller.
- Refrain from using a pointed spinner, propeller fasteners, or knife-edge leading edges.
- Paint tips of propellers a bright color to better define the arc of propeller rotation.
- Check the propeller and spinner for tightness before each operation.
- Learn and check for the proper grain patterns in wooden propellers to ensure strength in high-rpm operation.
- Exercise extreme caution in adjusting needle valve settings on engines. Most adjustments should be performed from behind the model, thus avoiding reaching around a spinning propeller.
- Ensure that ballast or heavy parts are not subject to loosening or jettisoning in flight.
- For Radio Control, perform a range check before each flying session and a check of flight functions before each flight.
- For Control Line, inspect the lines, bellcrank, and connectors before each flight.
- Carefully read and use the manufacturer’s recommendations for its products.
- Establish a spectator control system for any site used. Post the various rules required for the specific site. Enforce them!
- All model liquid fuels need to be stored and handled properly. In particular, gasoline should only be stored, transported, and dispensed from a specifically designed and approved container. When handling fuels near models, there should be no smoking. Avoid hooking up any starter, pump, or battery that may produce arcing in the immediate area where fuel is located.
- Post emergency instructions, including hospital and doctor telephone numbers and addresses. Provide a first-aid kit if possible. Encourage the use of eye and ear protectors and flying with a buddy or observer.
- Provide your local EMT station with directions to your flying site.

### **Lithium Battery Fires**

Lithium batteries have become extremely popular for powering control and power systems in models because of their high energy density (capacity/weight ratio) compared to Ni-Cds or other batteries. With high energy comes increased risk in their use. The principle risk is *fire*, which can result from improper charging, crash damage, or shorting the batteries.

All Lithium-battery vendors warn customers of this danger and recommend extreme caution in their use. However, many fires have resulted from the misuse of LiPo batteries, leading to the loss of models and automobiles. Other property, such as homes, garages, and workshops, have also burned.

A Lithium-battery fire burns explosively at several thousand degrees and is an excellent initiator for ancillary fires. Fire is caused by contact between Lithium and oxygen in the air. **It needs no other source of ignition, or fuel, to start.** The following is recommended for Lithium batteries to preclude ancillary fires:

- Store and charge in a fireproof container—never in your model.
- Charge in a protected area that is devoid of combustibles.

- In the event of damage from crashes, etc., carefully move the battery pack to a safe place for at least a half hour to observe. Physically damaged cells can erupt into flames. After sufficient time to ensure safety, the cells should be discarded in accordance with the instructions that come with the batteries. **Never attempt to charge a cell with physical damage**, regardless of how slight.
- Always use chargers designed for the **specific** purpose; it's preferable to have a fixed setting for your particular pack. Many fires occur while using selectable/adjustable chargers that are set improperly. Never attempt to charge Lithium cells with a charger that is not specifically designed for Lithium cells! **Never use chargers that are specifically designed for Ni-Cd batteries.**
- It is strongly recommended that you use charging systems that monitor, control, and balance the charge state of each cell in the pack. Unbalanced cells can lead to disaster if the system permits a single cell in the pack to be overcharged. This means that the charging system must provide charge cessation as each cell reaches the proper voltage. If the batteries show **any sign of swelling**, discontinue charging **and move them to a safe place—outside.** **They could erupt into flames.**

- **Never plug in a battery and leave it to charge unattended;** serious fires have resulted from this practice.
- Do not attempt to make your own battery packs from individual cells. Use only professionally packaged and labeled units which contain safer charging features.

#### *Notice to AMA Members Interested in Model Rocketry, RC Cars, and Boats*

Members interested in model rocketry, operation of radio-controlled cars, and boats are encouraged to obtain a copy of the official safety codes used by the various organizations. These codes may be obtained by contacting the various rocketry, car, and boat groups listed as special interest organizations on the last page of this manual.

There are prepurchase requirements for the operation and/or purchase of model rocket engines in various states. Check out your state government website (often the state fire marshall's office) to determine if additional regulations are applicable in your state.

## *Radio Control Operation*

### **Operation of RC Flying Sites:**

**Frequency Control:** It is necessary to maintain strict control of the operating transmitters at a flying site. Only one transmitter can be operated on any given frequency at any time. Operation of more than one transmitter on the same frequency will cause loss of model control. Safe management of operating transmitters can be aided by:

1. Use of frequency pins to identify the frequency in use. Pins, often clothespins, are marked with the color or channel number of the frequencies they represent. Only one pin is available at the flying site for each frequency. Transmitters shall not be operated without possession of a pin that identifies the frequency in use.
2. Clubs providing a flightline control system for the use of spread spectrum radios. This system should be similar to the frequency control plan currently in use at the site. For spread spectrum, multiple pins or identification spaces should be provided.
3. Keeping transmitter antennas collapsed when models are not being flown.

**Active frequency monitoring** at flying sites is encouraged.

Scanning receivers or a spectrum analyzer are excellent monitors of unwanted signals.

**It is recommended that CDs** or club officers require tests, or implement special frequency-control arrangements, as may be necessary, to reduce the chance of interference among RC systems.

### **Transmitter Requirements:**

**Narrowband transmitters are required** for use with all channel number frequencies (CH 00-09 and 11-90).

**Identification of narrowband transmitters** is normally accomplished by a sophisticated laboratory test. Narrowband transmitters can also be identified as follows.

1. All PPM/FM and PCM/FM transmitters are narrowband. Only AM transmitters sold as new, prior to March 1993, are suspect.
2. The manufacturer of a suspect AM transmitter can verify if it is narrowband. If it is not, the manufacturer may offer to modify it to narrowband specifications.

**Any user modification of a transmitter** that might affect the transmitted signal is prohibited by law and safety concerns. This includes user replacement of frequency determining plug-in crystals and use of plug-in frequency modules from another manufacturer. Transmitter crystal replacement, with or without a change in frequency, requires transmitter emission realignment by the manufacturer. Use of a frequency determining module manufactured for use in another brand of transmitter can result in off frequency and spurious emissions that cause interference to other fliers.

### **Receiver requirements:**

**Receivers that meet the AMA Guidelines** of reference 2 (see references at the end of this section) are recommended for use at flying sites where several channel-number frequencies are in simultaneous use. Receivers that do not meet the AMA Guidelines (reference 2) may experience interference when operated at an active flying site with several transmitters operating simultaneously.

**Identification of AMA Guideline receivers** is normally accomplished by a sophisticated laboratory test. The manufacturer of a receiver can identify if it is a design that meets the AMA Guidelines of reference 2.

A go-no go field test can determine if a receiver has acceptable, but not necessarily AMA Guideline, performance. The test requires the use of two interfering transmitters in addition to the controlling transmitter. The two interfering transmitters can be on any channel other than the controlling channel and can use any combination of AM or FM emission. All three transmitters must be on different channels in the same RC band. The two aircraft RC bands are CH 00-09 and CH 11-60.

The following **RC Receiver Field Test diagram** shows the location of the field-test equipment. To perform the test, the controlling transmitter, T1, is located 100 feet from the stationary model using the receiver being tested. The individuals holding the interfering transmitters, T2 and T3, are along a line, 10 feet apart, parallel to the 100-foot baseline. Starting at 15 feet from the model, they walk together toward the model. All three transmitter antennas are fully extended and transmitters are operating. The individuals with the interfering transmitters observe and note when any loss of control occurs. Control failure can occur in AM, FM, or PCM receivers. The minimum acceptable distance the interfering