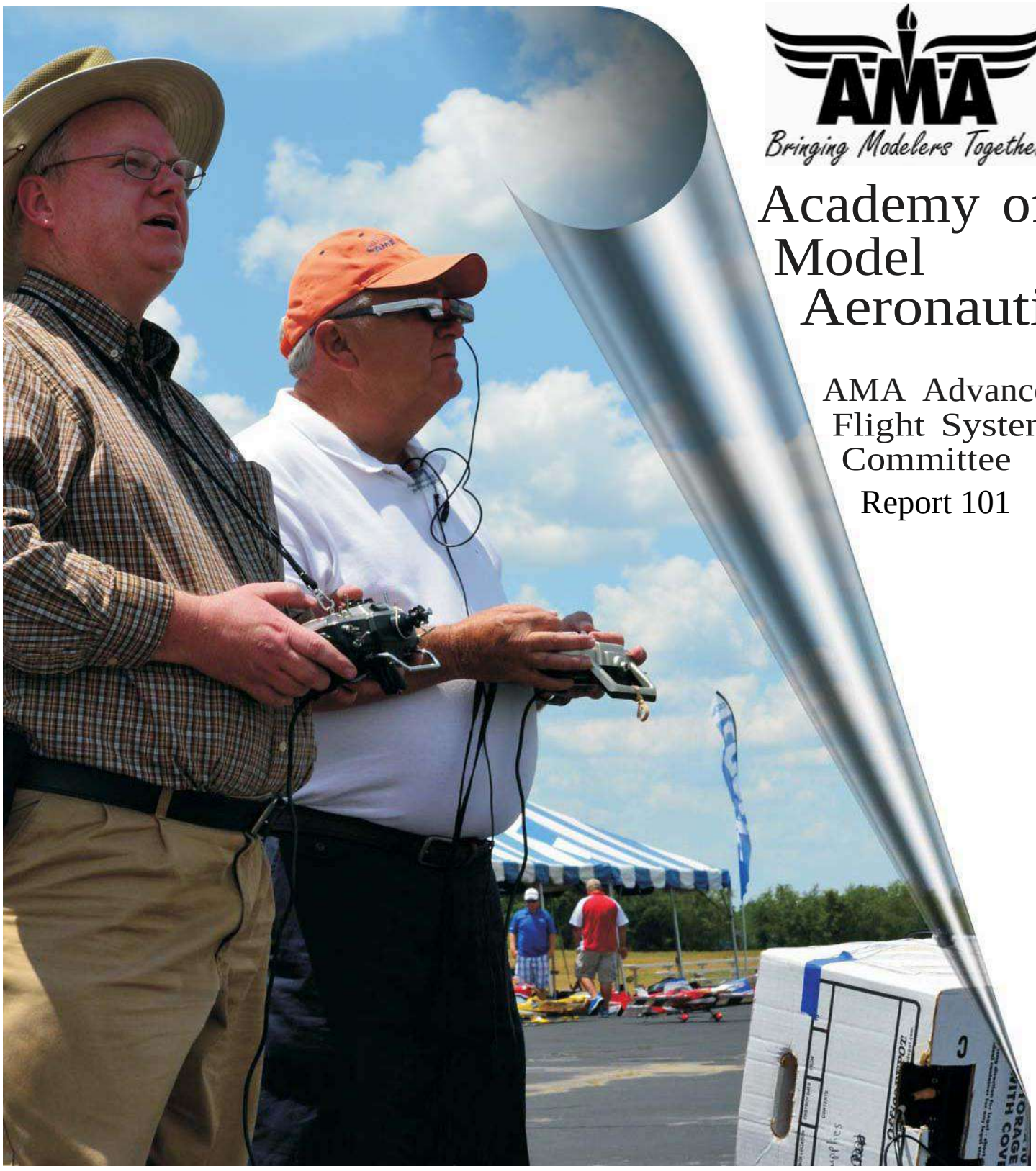

Bringing Modelers Together

Academy of Model Aeronautics

AMA Advanced Flight Systems Committee

Report 101

AMA Policies for Radio Controlled Model Aircraft Operations Utilizing First Person View, Failsafe, Stabilization and Autopilot Systems

(Revision 07/20/2013)

Academy of Model Aeronautics
"AMA Advanced Flight Systems Committee"
amaflightsystems@gmail.com

October 21, 2012
RE: AMA Flight Systems Policies
AMA Documents #550 and #560

Greetings,

In June of 2012 the AMA Advanced Flight Systems Committee (AFSC) was created for the purpose of developing operational policies and guidelines for advanced flight systems used in radio controlled model aircraft.

The committee's first project was to evaluate and revise AMA's current policies for "*R/C Model Aircraft Operations Utilizing First Person View Systems"* (AMA Document #550) and *"R/C Model Aircraft Operations Utilizing Failsafe, Stabilization & Autopilot Systems"* (AMA Document #560).

The committee in a collaborative effort with leading members of the hobby industry and FPV community revised these documents and presented this report to the Executive Council during the October 20, 2012 council meeting. Revisions were made and the report and documents were adopted by the council.

As new aeromodeling technologies emerge the AFSC will develop and/or revise AMA operational documents/policies. A footer to each document page contains the latest revision date.

Thank you,

Bob Brown
AMA President

Academy of Model Aeronautics

AMA Advanced Flight Systems Committee
amaflightsystems@gmail.com

Radio Controlled Model Aircraft Operations
AMA Documents #550 and #560

Additional Updates of AMA Flight System Documents #550 and #560:

The AMA posted on the AMA website its revised policies for R/C model aircraft operations utilizing First Person View (FPV) systems (AMA document # 550) and Failsafe, Stabilization and Autopilot Systems (AMA document #560) on November 2, 2012.

After a two month review by aeromodeling stakeholders, including members of the AMA and FPV community, the AMA Advanced Flight Systems Committee responded to questions for additional clarification for some operational statements within the documents. As a result of this collaboration several items within AMA documents #550 and #560 were revised on 01/14/2013 and the updated documents have been posted in the AMA website Document section titled “Advanced Flight Systems”.

The committee appreciates those FPV enthusiasts and stakeholders who offered suggestions for operational changes to enhance the documents and improve clarity.

The AMA recognizes the importance of providing relevant and up-to-date operational policies and guidelines enabling members to utilize and participate in new aeromodeling technologies and disciplines. The AFS committee welcomes continued collaboration with aeromodeling stakeholders in efforts to improve the quality of AMA’s safety programing.

Andy Argenio
AMA Chairman
Advanced Flight Systems Committee
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Table of Contents

Academy of Model Aeronautics
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Introduction
Radio Controlled Model Aircraft Operations
Utilizing First Person View, Failsafe, Stabilization and Autopilot Systems

1. Background:

AMA created its "*First Person View*" (FPV) policy (*AMA Document #550*) in 2008 *and "Manually Controllable Programed Outdoor Model Flight Operations"* policy (*AMA Document #560*) in 2011. These policies were adopted to provide operational guidelines for AMA members that would enable them to participate in these disciplines within the parameters of AMA's safety programming.

In recent years FPV, stabilization, and autopilot systems have become more reliable and safer for flying model aircraft. Advancements in technology, as well as the increased number of people participating in FPV flying prompted AMA members and nonmembers to request a review of documents #550 and #560 to consider revisions that would relax some requirements.

In June of 2012, AMA President Bob Brown established an AMA committee to evaluate and revise AMA's current policy documents #550 and #560. Subsequently, a decision was made to broaden the objectives of the committee to evaluate and/or develop policies for any new aeromodeling technologies resulting in the following committee name and mission.

Advanced Flight Systems Committee (AFSC)
amaflightsystems@gmail.com

Mission Statement: "*To analyze advanced flight systems for the purpose of developing program-specific operational requirements, procedures, guidelines, and recommendations to ensure compliance with or updating of AMA's National Model Aircraft Safety Code."*

Committee members were chosen because of their knowledge and expertise of the AMA National Safety Code and Insurance program, FAA and Government Relations, Public Relations, Unmanned Aerial Systems, and/or Engineering/Technology.
Chairman: Andy Argenio
Committee Members: Bob Brown, Dave Mathewson, Rich Hanson, Jim Rice, Lawrence Tougas, and Chris Brooks.

The committee's objectives are to develop operational procedures for advanced model aircraft flight systems and to ensure AMA safety standards are maintained when embracing new technologies.

2. Considerations:

In the process of revising #550 and #560, the committee considered input from members including comments made in a petition from the FPV community sent to AMA leadership. Policy decisions had to comply with or address the requirements, issues, concerns and suggestions from the following documents, laws, members and membership groups:

- AMA's National Model Aircraft Safety Code
- Federal Bill H.R. 658/Public Law 112-95
- AMA's Liability Insurance Program ● Existing Aeromodeling Disciplines
- FPV Community and AMA Members

A review/comparison was done of other aeromodeling association's FPV policies. It included Model Aeronautics Association of Canada (MAAC), British Model Flying Association (BMFA), and Model Aeronautical Association of Australia (MAAA) and revealed that all required a spotter for the FPV pilot, range of flights were limited by law to VLOS, and buddy boxes were required at all times.

3. Membership Education:

The committee recognized a need to educate members on FPV and autopilot system by including in the revised documents a section for definitions, recommendations, and general information. Members often times mistakenly associate FPV and autopilot activities with their knowledge of drones. AMA modelers are not building or purchasing UAVs or drones whose flights are mission oriented, or flown beyond VLOS, or computer controlled for nearly their entire flight. AMA members are attracted to the recreational visual experience of FPV flying and the use of stabilization and autopilot systems to improve flight performance.

Without a basic understanding of these systems and AMA's rules for implementation and operation, erroneous assumptions have been made that these systems present a greater risk for model aircraft accidents/incidents and the AMA should exclude these types of operations for AMA members. The fact is stabilization and autopilot systems in model aircraft have the capability to reduce the risk and severity of model aircraft accidents. Several examples follow:

- AMA FPV flying involves two persons, a pilot and spotter, providing a higher level of situational awareness surrounding the model aircraft to identify and prevent conflicts or collisions.
- R/C Pilots have direct transmitter control to activate or deactivate programmable autopilot systems to recover an out of control model aircraft to level flight, maintain a heading, return an aircraft to a selected location, or initiate a programmed flight path.
- Autopilot systems may be programmed to prevent a flyaway by safely returning a model aircraft to a selected safe location when a radio link is lost.

Radio Controlled Model Aircraft Operation Utilizing "First Person View" Systems

1. DEFINITION OF TERMS:

Please refer to Page 5 section 7 which contains an alphabetical listing of the definitions of the terms in italics that are used in this document.

2. GENERAL:

FPV flying of radio control model aircraft by AMA members is allowed only for noncommercial purposes as a hobby/recreational and/or competition activity and must be conducted in accordance with AMA's current National Model Aircraft Safety Code and any additional rules specific to a flying site/location.

3. OPERATIONS – REQUIREMENTS – LIMITATIONS:

a) *FPV novice pilots* undergoing training at low altitude must use a buddy-box system with an *FPV spotter,* or must go to a safer altitude if no buddy-box system is used.

b) All *FPV* flights require an AMA *FPV pilot* to have an AMA *FPV spotter* next to him/her maintaining *VLOS* with the *FPV aircraft* throughout its flight.

c) The *FPV pilot* must brief the *FPV spotter* on the *FPV spotter's* duties, communications and hand-over control procedures before *FPV flight*.

d) The AMA *FPV spotter* must communicate with the *FPV pilot* to ensure the *FPV aircraft* remains within *VLOS*, warning the *FPV pilot* of approaching aircraft, and when avoidance techniques are necessary.

e) During an FPV flight, the FPV spotter must be prepared to acquire the transmitter/control from the *FPV pilot* and assume *VLOS* control of the model aircraft at any time safe operation of the flight is in question.

f) If an *FPV pilot* experiences a safety issue that does not appear to be a brief glitch, they must abandon *FPV* mode and fly *VLOS*.

g) Before the initial *FPV* flight of an *FPV model aircraft* and/or after any changes or repairs *to essential flight systems*, the *FPV model aircraft* must have an *R/C test flight* by conventional *VLOS*.

h) *FPV model aircraft* must use frequencies approved by the FCC for both the RC system and the wireless video system. Pilots must meet applicable FCC licensing requirements if they choose to operate the RC flight control system or the wireless video system on Amateur Band frequencies.

i) AMA *FPV pilots* must first be capable of flying their FPV model aircraft manually before utilizing *FPV* flight.

4. RANGE – ALTITUDE – WEIGHT – SPEED:

a) One of the requirements in Federal Law (Public Law 112-95 Sec 336 (c) (2) February 14, 2012) for model aircraft to be excluded from FAA regulations is that model aircraft must be flown within *VLOS* of the operator.

b) Model aircraft flown using *FPV* must remain at or below 400 feet AGL when within 3 miles of an airport as specified in the AMA Safety Code.

c) Model aircraft flown *FPV* are limited to a weight (including fuel, batteries, and onboard *FPV* equipment) of 15lbs. and a speed of 70mph.

5. RECOMMENDATIONS & INFORMATION:

a) AMA *FPV novice pilots* should consider using a cockpit view flight simulator to become accustomed to *FPV* flight.

b) AMA *FPV pilots* should consider using a programmable *autopilot* (AMA Document #560) with a failsafe "return to launch" (RTL) feature that will maintain control of the aircraft in the event of signal loss.

c) When purchasing *FPV* operational systems, always try to select quality equipment, verify its compatibility, install components for interference rejection, and determine that signal range is adequate for maximum VLOS range.

6. PRIVACY PROTECTION SAFEGUARDS:

The use of imaging technology for aerial surveillance with radio control model aircraft having the capability of obtaining high-resolution photographs and/or video, or using any types of sensors, for the collection, retention, or dissemination of surveillance data information on individuals, homes, businesses, or property at locations where there is a reasonable expectation of privacy is strictly prohibited by the AMA unless written expressed permission is obtained from the individual property owners or managers.

7. DEFINITIONS OF TERMS:

AMA FPV Pilot is an AMA member who is capable of maintaining stable flight of a model aircraft within its intended flight envelope when flown FPV without losing control or having a collision.

Buddy-Box System is a system that has one transmitter operating as the master controller, while a second transmitter is linked/slaved to it allowing dual control of an aircraft. The operator of the master transmitter allows one or the other transmitter to control the aircraft through the use of a spring-loaded switch. The switch provides instantaneous transfer of control from one transmitter to the other. The buddy-box system is an efficient and effective means of achieving a position transfer of control from one pilot to another.

Although this system is commonly used for training novice fliers, it is also useful in situations where an experienced pilot may have an increased likelihood of needing a second pilot's assistance in maintaining control of the aircraft. The use of the buddy-box may be helpful in assisting pilots with physical limitations, flying in congested environments, during times of reduced visibility, or anytime during FPV when a timely transfer of control may be beneficial.

Essential Flight Systems are any systems or components necessary to maintain stable flight within a model aircraft's flight envelope. (This includes primary radio control systems and any stabilization or gyros required to maintain stability and heading in certain types of model aircraft that would be uncontrollable/unstable without their use).

First Person View (FPV) refers to the operation of a radio controlled (R/C) model aircraft using an onboard camera's cockpit view to orient and control the aircraft.

Flight Envelope is defined as the range of airspeeds, attitudes, and flight maneuvers which a model aircraft can safely perform/operate for its intended use.

FPV Aircraft is an RC model aircraft equipped with a video transmitter to send real-time video images from an onboard camera to a ground based receiver for display on a pilot's video monitor/goggles. (*FPV model aircraft* types include: Fixed Wing, Rotary Wing, and Multi-Rotor Platforms).

FPV Novice Pilot is an AMA member learning to fly *FPV* utilizing a buddy-box system with an experienced AMA *RC pilot* operating the master transmitter and serving as the *FPV spotter*.

FPV Spotter is an experienced AMA *RC pilot* who has been briefed by the *FPV pilot* on the tasks, responsibilities and procedures involved in being a spotter; is capable and mature enough to perform the duties and is able to assume conventional *VLOS* control of the aircraft.

Non-Essential Flight Systems are any systems or components that are not necessary to maintain stable flight within the model aircraft's *flight envelope*. (This includes *autopilot* or *stabilization systems* that can be activated and deactivated in flight by the pilot without affecting stable flight).

R/C Test Flight requires an *AMA Pilot* to manually operate an R/C transmitter to control a model aircraft's flight path and determine if the aircraft is capable of maintaining stable flight within its *flight envelope*.

Visual Line Of Sight (VLOS) is the distance at which the pilot is able to maintain visual contact with the aircraft and determine its orientation without enhancements other than corrective lenses.

Academy of Model Aeronautics
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Radio Controlled Model Aircraft Operation Utilizing Failsafe, Stabilization and Autopilot Systems

1. DEFINITION OF TERMS:

Please refer to Page 8 section 7 which contains an alphabetical listing of the definitions of the terms in italics that are used in this document.

2. GENERAL:

All model aircraft flights utilizing *stabilization* and *autopilot* control systems must be conducted in accordance with AMA's current National Model Aircraft Safety Code and any additional rules specific to a flying site/location.

3. OPERATIONS – REQUIREMENTS – LIMITATIONS:

a) AMA members flying radio controlled model aircraft equipped with flight *stabilization* and *autopilot* systems must maintain *VLOS* with the aircraft at all times including programmed autopilot waypoint flight.

b) *AMA Pilots* must be able to instantaneously deactivate programmed flight of *autopilot systems* at any time during flight and resume manual control of the model aircraft.

c) *AMA Pilots* must perform an *R/C Test Flight* of a model aircraft before activating a newly installed *autopilot* or *stabilization system* and/or after any repairs or replacement of model aircraft *essential flight systems*.

d) Model aircraft exceeding 15lbs and/or 70mph may only use an *autopilot* for a programmed "return to launch" (RTL) flight and not for programmed waypoint flying of a predetermined course.

e) STABILIZATION & AUTOPILOT SYSTEMS MAY BE USED FOR/TO:

- Stabilization/automatically stabilize aircraft to level flight when control sticks are centered.
- Recovery/activate TRX switch to recover an out of control aircraft to level flight.
- Heading/activate TRX switch to hold a model aircraft's heading for precision flight path.
- Altitude/activate TRX switch to maintain fixed aircraft altitude while allowing directional control.
- Return GPS/activate TRX switch to return aircraft via GPS to launch point.
- Return FSS/failsafe activated from radio signal loss to return aircraft via GPS to launch point.
- Fixed circle/activate TRX switch to circle aircraft at point of activation at fixed altitude.
- Waypoint/activate TRX switch to initiate an autopilot programmed flight path via waypoints.
- Fencing/autopilot programed to display site unique boundaries on video monitor/goggles.

4. RANGE – ALTITUDE – WEIGHT – SPEED:

a) One of the requirements in Federal Law (Public Law 112-95 Sec 336 (c) (2) February 14, 2012) for model aircraft to be excluded from FAA regulations is that model aircraft be flown within *VLOS* of the operator.

b) Model aircraft must be flown at or below 400 feet AGL when within 3 miles of an airport as stated in the AMA Safety Code.

c) Model aircraft utilizing an *autopilot* for waypoint flying are limited to a maximum weight (including fuel, batteries, and onboard *autopilot systems*) of 15lbs and a speed of 70mph.

5. RECOMMENDATIONS & INFORMATION:

a) If your radio system lacks *failsafe* capability, consider using programmable digital servos or auxiliary *failsafe* modules. In the event of a radio signal failure these components will activate desired safe servo settings or an *autopilot* for return to base/launch (RTL).

b) When using an *autopilot system* the "return to launch" (RTL) feature should be programmed to return the aircraft to a safe location and safely terminate the flight should manual control of the aircraft be lost. When using RTL, pay particular attention to the manufacturer's throttle recommendations to prevent stalling.

c) The use of *stabilization systems* is recommended when flying FPV to improve flight stability and video quality.

d) Pilots usually choose to incorporate *stabilization* and *autopilot systems* for model aircraft flying to enhance flight performance, correct bad tendencies of the model aircraft, maintain stability in windy weather, establish precision heading holds for takeoffs/landings, flight training for novice pilots, create a steady flight platform for cameras, and generally just to make an airplane easier and safer to fly.

e) When purchasing *stabilization* and *autopilot systems*, always try to select quality equipment from reputable dealers, ensure for compatibility with other onboard systems, and install components according to manufacturers' instructions.

6. PRIVACY PROTECTION SAFEGUARDS:

The use of imaging technology for aerial surveillance with radio control model aircraft having the capability of obtaining high-resolution photographs and/or video, or using any types of sensors, for the collection, retention, or dissemination of surveillance data or information on individuals, homes, businesses, or property at locations where there is a reasonable expectation of privacy is strictly prohibited by the AMA unless written expressed permission is obtained from the individual property owners or managers.

7. DEFINITIONS OF TERMS:

AMA Pilot is an AMA member who is capable of manually operating an R/C transmitter to control a model aircraft's flight path within its safe intended *flight envelope* without losing control or having a collision.

Autopilot Systems incorporate programmable flight *stabilization* with an altitude sensor and a GPS receiver for accurate positioning and to navigate/control a radio controlled model aircraft's flight path. Advanced systems offer software for entering navigable waypoints. The flight data waypoints may be saved to autopilot's/GPS memory for programmed flight.

Essential Flight Systems are any systems or components necessary to maintain stable flight within a model aircraft's *flight envelope*. (This includes primary R/C systems and any *stabilization* or gyros required to maintain stability and heading in certain types of model aircraft that would be uncontrollable/unstable without their use).

Failsafe Systems are designed to minimize or prevent damage and safely terminate a flight when a radio controlled model aircraft loses radio signal. Modern radio systems can be programmed to position servos to a desired control setting in the event of radio signal failure.

First Person View (FPV) refers to the operation of a radio controlled (R/C) model aircraft using an onboard camera's cockpit view to orient and control the aircraft. (AMA Document #550).

Flight Envelope is defined as the range of airspeeds, attitudes and flight maneuvers which a model aircraft can safely perform/operate for its intended use.

Non-Essential Flight Systems are any systems or components that are not necessary to maintain stable flight within the model aircraft's intended flight envelope. (This includes *autopilot* or *stabilization systems* that can be activated and deactivated in flight by the pilot without affecting manually controlled stable flight).

R/C Test Flight requires an AMA Pilot to manually operate an R/C transmitter to control a model aircraft's flight path and determine if the aircraft is capable of maintaining stable flight within its safe intended *flight envelope*.

Stabilization Systems are designed to maintain intended model aircraft flight attitudes. The pilot can install, program and/or activate a system to stabilize yaw, pitch, or roll or any one attitude or combination of attitudes. Systems are often based on rate/heading hold gyros or inertial motion sensors utilizing multi-axis gyros and accelerometers for attitude stabilization.

Visual Line of Sight (VLOS) is the distance at which the pilot is able to maintain visual contact with the aircraft and determine its orientation and attitude without enhancements other than corrective lenses.

FREQUENTLY ASKED QUESTIONS

Model Aircraft Radio Control Operations Utilizing FIRST PERSON VIEW, STABILIZATION, AND AUTOPILOT SYSTEMS

1. **I thought it was AMA's policy to stay clear of Drone type flying using programmed flight control systems?**

   There are distinct differences between R/C FPV autopilot equipped model aircraft flying and Drone flying. Drone flights are mission oriented, flown beyond VLOS, and computer controlled for nearly their entire flight. AMA members fly R/C FPV autopilot equipped model aircraft as a recreational visual/video experience. The AMA FPV pilot is required to fly within VLOS and manually controls the aircraft via R/C for nearly the entire flight.

2. **Why has AMA chosen to limit FPV flying to VLOS when it is not currently required in the law?**

   Section 4-a of AMA document 550 and 560 states that one of the requirements in Federal Law (Public Law 112-95 Sec 336 (c) (2) February 14, 2012) for model aircraft to be excluded from FAA regulations is that model aircraft be flown within VLOS of the operator. The AMA has chosen the exclusionary path to protect and advocate for the interest of its members rather than be subject to potentially onerous governmental regulations.

3. **Will AMA pilots flying FPV beyond VLOS be covered by AMA liability insurance?**

   Coverage under the policy will be determined by the specific facts and details relating to the claim. As intentionally flying FPV aircraft beyond VLOS of the operator violates AMA Safety Code and documents 550 and 560, the AMA pilot should not rely on AMA insurance for coverage.

4. **Why were weight and speed limits set at 15lbs and 70mph for FPV flying or when using an autopilot for waypoint flying?**

   FPV aircraft speed limits were set lower than other R/C model aircraft to allow for easier visual tracking of model aircraft by the FPV Spotter and to provide extra time for the FPV Pilot to handover a transmitter to the FPV Spotter in the event of an approaching aircraft or incident.

   Model aircraft weight while flying FPV and/or the use of autopilot systems for waypoint flying was limited to 15lbs to reduce the potential or perception that someone could use these types of aircraft to carry a destructive payload beyond VLOS. Flying model aircraft while using stabilization and/or failsafe systems and/or activating an autopilot system for return to launch does not limit the aircraft to a weight of 15lbs.

5. **Why did the AMA decide to eliminate the buddy-box requirement for FPV flying**?

   The FPV Pilot is often more experienced and able to maneuver his FPV aircraft out of problem status with verbal cues from the FPV Spotter rather than having the FPV Spotter take over control using a buddy-box. The FPV Pilot will know when the video link is lost before the FPV Spotter and will hand over the transmitter to the FPV Spotter. The cost and availability of compatible and programmable radiotransmitters for use as a buddy-box for complex FPV aircraft systems may also preclude the use of a buddy-box. It is also possible that some of the more complex systems might require the buddy box port for flight/camera operations.

6. **Does the FPV Spotter need to be an experienced FPV Pilot?**

   The FPV Spotter is required to be an experienced R/C Pilot but doesn't need to be an experienced FPV Pilot since he will only be required to fly the FPV Aircraft by conventional VLOS in the event of an incident.

7. **When will an FPV Novice Pilot assume FPV Pilot status?**

   When an FPV Novice Pilot is able to consistently maintain control of stability and orientation while flying an FPV aircraft, without losing control or having a collision, he/she may assume FPV Pilot status. The buddy-box is no longer required for FPV Pilots.

8. **Will my AMA club have to allow FPV flying at the club's AMA chartered club field?**

   Each AMA club and/or site owner or property manager decides what can or cannot be flown at a particular flying site.

9. **I have heard that FPV flying and the use of complex autopilot systems will create a much greater risk of accidents occurring at my club's flying site. If this is true, shouldn't the AMA exclude FPV and Autopilot flying at all AMA chartered flying sites?**

   Educating members so they understand the basics of these systems and AMA's requirements for use and implementation should alleviate these erroneous assumptions. The fact is FPV flying and the use of Stabilization and Autopilot systems in model aircraft have the capability to reduce the risk and severity of model aircraft accidents.

10. **Was there any consideration given to having a proficiency system for FPV Pilots similar to what jet pilots have to undergo?**

    When necessary, as with high energy and high risk turbine powered aircraft, pilot testing was implemented into our safety programming to mitigate the risks involved. The committee felt that requiring a Spotter for FPV and providing a transmitter hand-over protocol for FPV Pilots and a buddy-box for novice pilots, would ensure AMA Safety Standards were maintained.

11. **Who qualifies AMA FPV Pilots?**

    Except for AMA members piloting turbine powered model aircraft, the AMA doesn't require pilot proficiency testing. Individual AMA Clubs may establish their own pilot testing requirements for their members which may require the members to demonstrate and be judged on their flying proficiency. The AMA does expect members to use their good judgment to decide for themselves whether or not they can fly a model aircraft safely. With regard to FPV flying this would be when the AMA FPV Novice Pilot was satisfied that he/she was capable of maintaining control of stability and orientation of FPV model aircraft when flown FPV without losing control or having a collision. The FPV novice pilot would now have AMA FPV Pilot status.

12. **Will elimination of the buddy-box requirement and hand-over control to the FPV Spotter create a greater risk of accidents?**

    We discovered in our observations that FPV flying for the most part took place at either higher altitudes or lower "near ground" altitudes then typical model aircraft flying. Hand-over transferring of the transmitter from the FPV Pilot to the Spotter provided sufficient time for recovery at the higher altitudes. Transference via the buddy-box for an out of control FPV aircraft at the lower altitudes didn't provide a better chance of preventing a crash than handing over control to the spotter. Both methods proved inadequate at these near ground or lower altitudes.

13. **Are AMA members covered by AMA insurance when their model aircraft's FPV flight goes beyond the AMA chartered club's flying site boundaries?**

    AMA insurance liability protection is not limited to AMA charted club flying sites or the flight boundaries of the site. It applies to accidents arising from AMA member modeling activities of model aircraft conducted in accordance with AMA's National Safety Code. As long as AMA pilots don't fly at locations where model airplane flying is prohibited and avoid flying directly over unprotected people, vessels, vehicles or structures and avoid endangering life or property, AMA insurance coverage will be extended. This coverage also extends to an accidental model aircraft fly-away beyond the permitted flying site that may cause bodily injury or property damage at any location where the crash occurs.

14. **Can FPV model aircraft be flown by AMA members at altitudes above 400' and is there any chance that we might someday be able to fly beyond VLOS?**

    In 1981 FAA Advisory Circular AC 91-57 advised that model aircraft not exceed altitudes of 400ft. At this time there is no FAA regulation/rule preventing model aircraft from flying above 400' AGL. For the past 32 years the AMA applied this FAA advisory only within 3 miles of an airport in the AMA National Safety Code. The AMA will continue to use all its resources to prevent the FAA from making 400' a regulation/rule for all locations of model aircraft flying. Public Law 112-95 Sec 336 requires model aircraft be flown within VLOS. As you might expect this is acceptable by the majority of AMA members but limiting to FPV activity. We are looking into alternative methods to support FPV activity beyond VLOS as new FPV technology (perhaps sense and avoid) becomes available and risks assessed and mitigated to a safe and acceptable level to perhaps someday fly beyond VLOS.

15. **Why were privacy protection requirements included in the revised documents?**

    These safeguards were included to provide 4th Amendment rights to privacy protection for individuals and their property from model aircraft equipped with imaging technology ***when used for surveillance.*** *One of the provisions in Federal Law 112-95 Sec 336-2 for model aircraft to be excluded from FAA regulations requires model aircraft are operated within the programming of a nationwide community-based organization (CBO) that has been accepted/approved for CBO status by the FAA. The AMA has chosen this path in order to operate under its accepted Safety Code and Operational Requirements including Privacy Protection Safeguards rather than be subject to potentially onerous governmental regulations with respect to Privacy Protection for those operating model aircraft outside of the CBO default path. We also had a responsibility to provide operational standards that are acceptable and compliant within our insurance programming, requiring members to operate their model aircraft without violating existing laws which could include first and fourth amendment rights of citizens to privacy protection in cases where a suit is filed for invasion of privacy as a result of unauthorized aerial surveillance.*

16. Does the AMA Privacy Protection Statement essential outlaw aerial photography and videoing?

The AFS committee views the updated AMA Privacy Protection Statement as not at all outlawing aerial photographing or videoing. We believe it's better for us to have written our own Privacy Protection Safeguard then leave it unattended; waiting for what very well may be onerous government privacy regulation. In the US anyone may take photos/videos in public places except when a legal statute or ordinance exist and when individuals are in places where they have a reasonable expectation of privacy such as restrooms, dressing rooms, medical facilities and inside their homes. Property owners may legally prohibit video/photography on their premises but have no right to prohibit others from videoing/photographing their property from other locations (which may include from airspace near their property or 400' above their property without the use of telephoto lenses while not flying directly over people or structures). In most locations you may reasonably assume that taking video/photographs is allowed and that you do not need explicit permission. However, this is a judgment call and you should request permission when the circumstances suggest that the owner is likely to object. Taking aerial photos/videos that include a person's house and property may be fine but doing so in the fenced in pool area when someone is skinny dipping would not be permissible.

[4910-13] DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
14 CFR Part 91
Docket No. FAA-2006-25714

Unmanned Aircraft Operations in the National Airspace System
AGENCY: Federal Aviation Administration (FAA), DOT.
ACTION: Notice of policy; opportunity for feedback.
SUMMARY: This notice clarifies the FAA's current policy concerning operations of unmanned aircraft in the National Airspace System.

FOR FURTHER INFORMATION CONTACT: Kenneth D. Davis, Manager, Unmanned Aircraft Program Office, Aircraft Certification Service, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, (202) 385-4636, email: kenneth.d.davis@faa.gov.

Background

Simply stated, an unmanned aircraft is a device that is used, or is intended to be used, for flight in the air with no onboard pilot. These devices may be as simple as a remotely controlled model aircraft used for recreational purposes or as complex as surveillance aircraft flying over hostile areas in warfare. They may be controlled either manually or through an autopilot using a data link to connect the pilot to their aircraft. They may perform a variety of public services: surveillance, collection of air samples to determine levels of pollution, or rescue and recovery missions in crisis situations. They range in size from wingspans of six inches to 246 feet; and can weigh from approximately four ounces to over 25,600 pounds. The one thing they have in common is that their numbers and uses are growing dramatically. In the United States alone, approximately 50 companies, universities, and government organizations are developing and producing some 155 unmanned aircraft designs. Regulatory standards need to be developed to enable current technology for unmanned aircraft to comply with Title 14 Code of Federal Regulations (CFR). The Federal Aviation Administration's current policy is based on whether the unmanned aircraft is used as a public aircraft, civil aircraft or as a model aircraft.

Unmanned Aircraft Systems Operating as Public Aircraft

The most common public use of unmanned aircraft today in the United States is by the Department of Defense. U.S. operations in Iraq, Afghanistan and elsewhere have fueled a huge increase in unmanned aircraft demand. In Iraq alone, more than 700 unmanned aircraft are in use for surveillance and weapons delivery. Other agencies have also found public uses for unmanned aircraft. For example, the Customs and Border Protection uses them to patrol along the US/Mexican border. In the future, unmanned aircraft could be used to provide first responder reports of damage due to weather or other catastrophic causes. In response to this growing demand for public use unmanned aircraft operations, the FAA developed guidance in a Memorandum titled "Unmanned Aircraft Systems Operations in the U.S. National Airspace System – Interim Operational Approval Guidance" (UAS Policy 05-01). In this document, the FAA set out guidance for public use of unmanned aircraft by defining a process for evaluating applications for Certificate(s) of Waiver or Authorization (COA's) for unmanned aircraft to operate in the National Airspace System.

The concern was not only that unmanned aircraft operations might interfere with commercial and general aviation aircraft operations, but that they could also pose a safety problem for other airborne vehicles, and persons or property on the ground. The FAA guidance supports unmanned aircraft flight activity that can be conducted at an acceptable level of safety. In order to ensure this level of safety, the operator is required to establish the Unmanned Aircraft System's (UAS) airworthiness either from FAA certification, a DOD airworthiness statement, or by other approved means. Applicants also have to demonstrate that a collision with another aircraft or other airspace user is extremely improbable as well as complying with appropriate cloud and terrain clearances as required. Key to the concept is the roles of pilot-in-command (PIC) and observer. The PIC concept is essential to the safe operation of manned aircraft. The FAA's UAS guidance applies this PIC concept to unmanned aircraft and includes minimum qualifications and currency requirements. The PIC is simply the person in control of, and responsible for, the UAS. The role of the observer is to observe the activity of the unmanned aircraft and surrounding airspace, either through line-of-sight on the ground or in the air by means of a chase aircraft. In general, this means the pilot or observer must be, in most cases, within 1 mile laterally and 3,000 feet vertically of the unmanned aircraft. Direct communication between the PIC and the observer must be maintained at all times. Unmanned aircraft flight above 18,000 feet must be conducted under Instrument Flight Rules, on an IFR flight plan, must obtain ATC clearance, be equipped with at least a Mode C transponder (preferably Mode S), operating navigation lights and / or collision avoidance lights and maintain communication between the PIC and Air Traffic Control (ATC). Unmanned aircraft flights below 18,000 feet have similar requirements, except that if operators choose to operate on other than an IFR flight plan, they may be required to pre-coordinate with ATC.

The FAA has issued more than 50 COA's over the past 2 years and anticipates issuing a record number of COA's this year. For more information, Memorandum on UAS Policy (05-01) and other policy guidance is available at the FAA Website: http://www.faa.gov/uas.

Unmanned Aircraft Systems Operating as Civil Aircraft

Just as unmanned aircraft have a variety of uses in the public sector; their application in commercial or civil use is equally diverse. This is a quickly growing and important industry. Under FAA policy, operators who wish to fly an unmanned aircraft for civil use must obtain an FAA airworthiness certificate the same as any other type aircraft. The FAA is currently only issuing special airworthiness certificates in the experimental category. Experimental certificates are issued with accompanying operational limitations (14 CFR §91.319) that are appropriate to the applicant's operation. The FAA has issued five experimental certificates for unmanned aircraft systems for the purposes of research and development, marketing surveys, or crew training. UAS issued experimental certificates may not be used for compensation or hire. The applicable regulations for an experimental certificate are found in 14 CFR§§21.191, 21.193, and 21.195. In general, the applicant must state the intended use for the UAS and provide sufficient information to satisfy the FAA that the aircraft can be operated safely. The time or number of flights must be specified along with a description of the areas over which the aircraft would operate. The application must also include drawings or detailed photographs of the aircraft. An on-site review of the system and demonstration of the area of operation may be required. Additional information on how to apply for an experimental airworthiness certificate is available from Richard Posey, AIR-200, (202) 267-9538; email: richard.posey@faa.gov

Recreational/Sport Use of Model Airplanes

In 1981, in recognition of the safety issues raised by the operation of model aircraft, the FAA published Advisory Circular (AC) 91-57, Model Aircraft Operating Standards for the purpose of providing guidance to persons interested in flying model aircraft as a hobby or for recreational use. This guidance encourages good judgment on the part of operators so that persons on the ground or other aircraft in flight will not be endangered. The AC contains among other things, guidance for site selection. Users are advised to avoid noise sensitive areas such as parks, schools, hospitals, and churches. Hobbyists are advised not to fly in the vicinity of spectators until they are confident that the model aircraft has been flight tested and proven airworthy. Model aircraft should be flown below 400 feet above the surface to avoid other aircraft in flight. The FAA expects that hobbyists will operate these recreational model aircraft within visual line-of-sight. While the AC 91-57 was developed for model aircraft, some operators have used the AC as the basis for commercial flight operations.

Policy Statement

The current FAA policy for UAS operations is that no person may operate a UAS in the National Airspace System without specific authority. For UAS operating as public aircraft the authority is the COA, for UAS operating as civil aircraft the authority is special airworthiness certificates, and for model aircraft the authority is AC 91-57. The FAA recognizes that people and companies other than modelers might be flying UAS with the mistaken understanding that they are legally operating under the authority of AC 91-57. AC 91-57 only applies to modelers, and thus specifically excludes its use by persons or companies for business purposes. The FAA has undertaken a safety review that will examine the feasibility of creating a different category of unmanned "vehicles" that may be defined by the operator's visual line of sight and are also small and slow enough to adequately mitigate hazards to other aircraft and persons on the ground. The end product of this analysis may be a new flight authorization instrument similar to AC 91-57, but focused on operations which do not qualify as sport and recreation, but also may not require a certificate of airworthiness. They will, however, require compliance with applicable FAA regulations and guidance developed for this category. Feedback regarding current FAA policy for Unmanned Aircraft Systems can be submitted at www.faa.gov/uas. (Scroll down to the bottom of the page and find Contact UAPO. Click into this link.)

Issued in Washington, DC on February 6, 2007/s/ Nick Sabatini

Nicholas Sabatini
Associate Administrator for Aviation Safety

FAA Modernization and Reform Act of 2012

Senate Bill, Section 607(g) …exempts most model airplanes used for recreational or academic use from any UAS regulations established by the FAA

Conference Committee Report

Senate bill with modifications… *Language including model aircraft for the purposes of sports, competitions and academic purposes is removed and replaced with ``hobby''. The modified section includes language requiring that the model aircraft must be operated in a manner that does not interfere with and gives way, to all manned aircraft. In addition, language that requires that model aircraft flown within five miles of an airport will give prior notification to the airport and the air traffic control (ATC), and that model aircraft that are flown consistently within five miles of the ATC will do so under standing agreements with the airports and ATC. Lastly, language is added that will ensure that nothing in this provision will interfere with the Administrator's authority to pursue enforcement action against persons operating model aircraft who endanger the safety of the national airspace system. In this section the term ``nationwide community-based organization'' is intended to mean a membership based association that represents the aeromodeling community within the United States; provides its members a comprehensive set of safety guidelines that underscores safe aeromodeling operations within the National Airspace System and the protection and safety of the general public on the ground; develops and maintains mutually supportive programming with educational institutions, government entities and other aviation associations; and acts as a liaison with government agencies as an advocate for its members.*

SEC. 336. SPECIAL RULE FOR MODEL AIRCRAFT.

(a) In General.--Notwithstanding any other provision of law relating to the incorporation of unmanned aircraft systems into Federal Aviation Administration plans and policies, including this subtitle, the Administrator of the Federal Aviation Administration may not promulgate any rule or regulation regarding a model aircraft, or an aircraft being developed as a model aircraft, if--

(1) the aircraft is flown strictly for hobby or recreational use;

(2) the aircraft is operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization;

(3) the aircraft is limited to not more than 55 pounds unless otherwise certified through a design, construction, inspection, flight test, and operational safety program administered by a community-based organization;

(4) the aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft; and

(5) when flown within 5 miles of an airport, the operator of the aircraft provides the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport) with prior notice of the operation (model aircraft operators flying from a permanent location within 5 miles of an airport should establish a mutually-agreed upon operating procedure with the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport)).

(b) Statutory Construction.--Nothing in this section shall be construed to limit the authority of the Administrator to pursue enforcement action against persons operating model aircraft who endanger the safety of the national airspace system.

(c) Model Aircraft Defined.--In this section, the term ``model aircraft'' means an unmanned aircraft that is--

(1) capable of sustained flight in the atmosphere;

(2) flown within visual line of sight of the person operating the aircraft; and

(3) flown for hobby or recreational purposes.