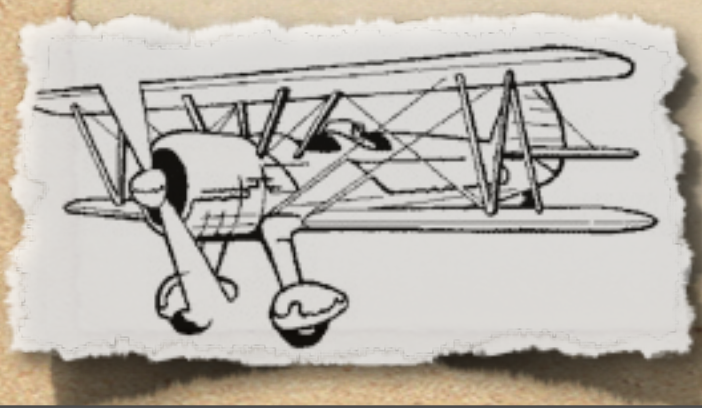
Introduction to RC Fixed-Wing Aircraft

Kitsap Aircraft Radio Control Society

(K-ARCS)



Introduction

So you want to start building and flying radio controlled (RC) aircraft!

Welcome!

Introduction

The question is, how to begin? With so many factors involved, and so many options from which to choose, how do you start?

This presentation will give you an overview of the common forms of fixed-wing RC aircraft models. By the time you've finished this slideshow, you will have the basic knowledge you need to decide how and where to start.

Introduction

So let's begin!

What kinds of RC planes are there?

- Trainers
- Sport
- Aerobatic
- Scale

What kinds of RC planes are there?

- Trainers
  - Usually high-winged, with lots of dihedral for maximum stability.
  - Usually tricycle geared for easier ground handing and landing characteristics.
  - Friendly stall characteristics.
  - Moderate power and larger wing for excellent recovery characteristics.
  - Low wing loading .

What kinds of RC planes are there?

- Park Fliers
  - Usually foam construction.
  - Relatively easy to fly.
  - Inexpensive ARF or RTF*
  - Most emulate real aircraft.

*Will be explained later in the presentation.

What kinds of RC planes are there?

- Sport
  - Usually mid or low winged for better stunt performance.
  - Still very stabile and relatively easy to handle.
  - Good Stall characteristics.
  - Frequently conventional geared (tail-dragger.)
  - Capable of performing basic aerobatics (loops, rolls, spins.)

What kinds of RC planes are there?

- Aerobatic
  - Almost always mid and straight-winged for maximum stunt performance.
  - Faster and less forgiving to handle.
  - Usually conventional geared (tail-dragger.)
  - Over powered.
  - More expensive.

What kinds of RC planes are there?

- Scale
  - Highest wing loading.
  - Most have dramatic, "scale" stall characteristics.
  - Expensive and difficult to build.
  - MOST difficult to fly - these don't handle like other RC aircraft.
  - NOT suitable for low-time RC pilots.

What kinds of RC planes are there?

- Scale
  - Scale models can range from the very small...

  .....to the completely HUGE!

What kind of plane should I get?

A TRAINER!

Why??

What kind of plane should I get?

A TRAINER!

- Only a high-wing trainer is recommended for a first time flier.
- All other types pose piloting challenges that are likely to result in expensive repairs and lost flying time due to down a/c.
- Trainers are designed to be easy to build and fly, and are among the least expensive of kits to acquire.

What kind of RC kits are available?

RC plane kits come in many forms. Each has it's own advantages and disadvantages.

We'll take a look at these forms so you can get an idea of what's involved with building each of them.

Types of RC kits

- The "Kit" kit
- The "ARC" (Almost-Ready-to-Cover)
- The "ARF" (Almost-Ready-to-Fly)
- The "RTF" (Ready-to-Fly)

Types of RC kits

- The "Kit" kit
  - Kits are the most basic.
  - Require maximum building time and tools.
  - Builder must provide electronics and power systems.
  - Comes with both assembly instructions and plans.

(Plans make repairs easier because all rib and former shapes are drawn full scale, making duplication easier.)

Types of RC kits

- The "ARC" (Almost-Ready-to-Cover)
  - Midway between a kit and an ARF.
  - Wing, fuselage and empennage structures are built.
  - Builder must add electronics and cover the structure.
  - Cover material may or may not be supplied.
  - Comes only with assembly instructions (no plans.)
  - Builder chooses the color scheme.

Types of RC kits

- The "ARF" (Almost-Ready-to-Fly)
  - Wing, fuselage and empennage structures come built and covered.
  - Builder simply assembles major structural components, electronics and power plant. (Servos and power-plant are usually provided.)
  - Manufacturer chooses the color scheme.
  - Builder usually provides radio equipment (Transmitter & Receiver.)

Types of RC kits

- The "RTF" (Ready-to-Fly)
  - Includes "Park Fliers."
  - Builder only connects wings and tail feathers to the fuselage, charges batteries or fills the tank, and flies.
  - Only kit version that includes a radio. (Radio is usually ONLY compatible with this one model.)

Cost Differences Between Types of Kits

The cost differences between types of kits are negligible. While the RTF can be the most expensive to purchase, it comes with everything needed to fly. Kits may be the least expensive to purchase, but the builder must supply all electronics, power systems and cover material.

What kind of RC kit should I build?

What kind of RC kit should I build?

That depends on the builder:

- How much time do you want to spend building? Kits can take over a hundred hours, while RTFs are done in minutes. ARFs usually take 15-40 hours to complete.
- How much do you enjoy building? Kits provide the maximum in flexibility for the builder, you can change whatever you like:
  - Do you want this plane to be a conventional or tricycle gear?
  - Do you want it to be electric or nitro (fuel.)
  - Do you want to add flaps, spoilers, airbrakes, retractable gear, etc?

What kind of RC kit should I build?

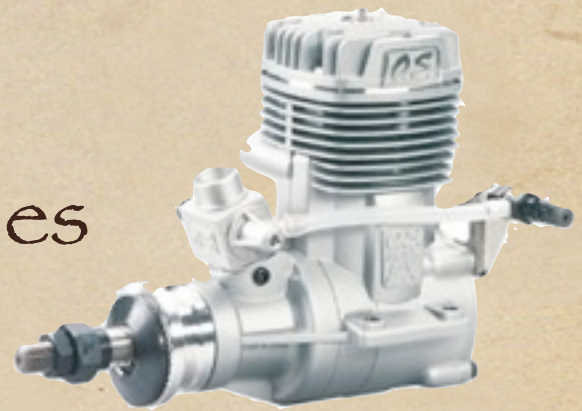
That depends on the builder:

- How much dedicated building space do you have?

  Putting a partially built kit away for dinner can be difficult.

Types of Power Plants

- "Nitro," or "Glow" Fuel Engines

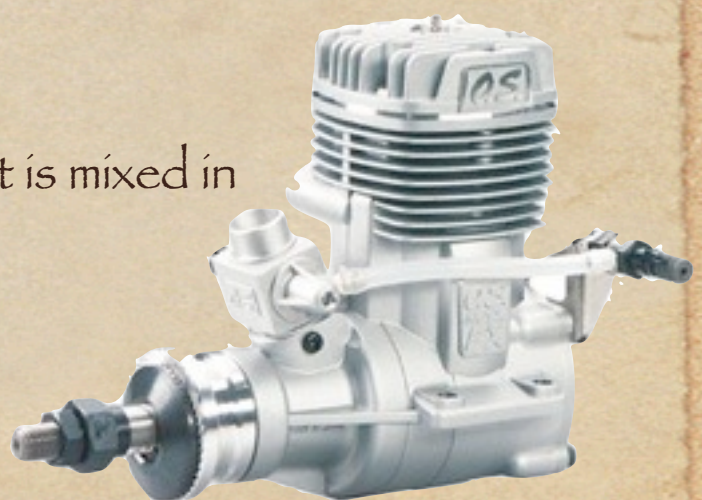


- Gas Engines

- Electric

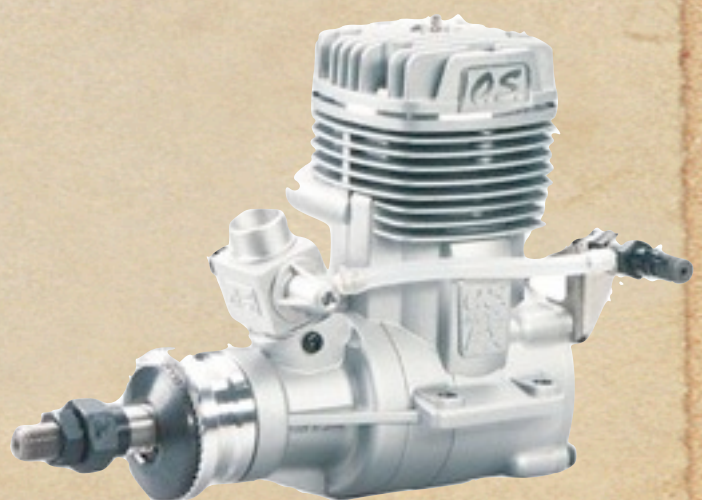
Types of Power Plants

- "Nitro," or "Glow" Fuel Engines
  - Nitro, or glow engines use a specific type of fuel which runs $17-$23 per gallon. One gallon will usually fuel 10-14 flights.
  - Advantages –
    - Smaller engines, suitable for small RC aircraft.
    - Engines are more affordable.
    - No oil systems are required – lubricant is mixed in by the fuel manufacturer.
    - Gas-and-go.



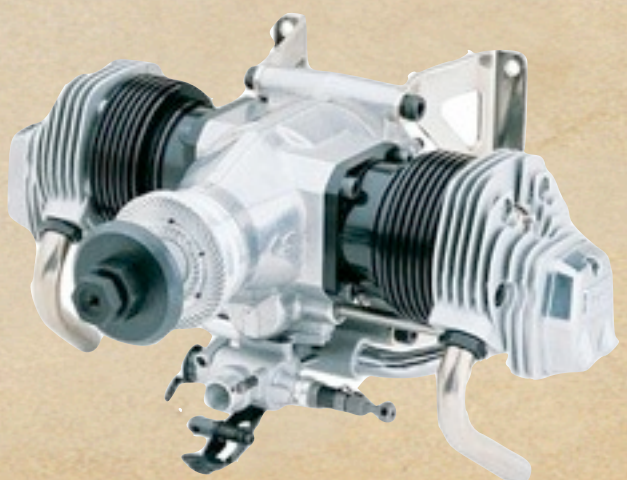
Types of Power Plants

- "Nitro," or "Glow" Fuel Engines
  - Disadvantages –
    - Fuel is expensive.
    - Total-loss lubrication: oil is expelled in the exhaust, making handling messy and cleaning required.



Types of Power Plants

- Gas Engines
  - Same fuel you use in your car.
  - Advantages -
    - Least expensive fuel option.
    - Less oil comes out the exhaust.
  - Disadvantages -
    - Engine itself is more expensive.
    - Large engines, more suitable for large aircraft.



Types of Power Plants

- Electric
  - Electric motors driven by batteries.
  - Advantages –
    - "Greenest" option. Batteries are fully rechargeable and cost pennies to recharge.
    - Batteries last for 100-200 flights.
    - No lubrication system – no cleaning required.
    - QUIET!

Types of Power Plants

- Electric
  - Electric motors driven by batteries.
  - Disadvantages –
    - Batteries take time to charge; multiple sets (up to 3 or 4) are required to keep flying.
    - Lithium-Polymer (Li-Po) batteries must be treated delicately and charged carefully due to susceptibility to fires.

Recommendation

- High-Wing Electric OR Nitro Trainer ARF
  - High-wing trainer
    - Best option by far for first time fliers.
    - Many kit options are available.
    - Nearly all models are tricycle gear.
  - ARF
    - Fastest first-flight option.
    - Reasonable cost option.
    - User selected radio.
    - Radio can be used on multiple models.
  - Electric and Nitro
    - Both options cost about the same for startup.
    - Having some of each would provide cadets with expanded experience.

Thanks for watching. Remember, Kitsap ARCS is here to help, and we will be glad to provide any assistance we can to get you on your way!