Centuri

Flying Model Rocket Catalog

1980 U.S. Edition

50¢ #801P

America's newest spaceship!

16 NEW PRODUCTS

BUCK ROGERS & FLYING SAUCER
Boeing A.L.C.M. CRUISE MISSILE
WORLD CHAMPIONSHIPS of Model Rocketry

BONUS!
- ROCKET TIMES Magazine
- AEROSPACE TEAM News
- 5 Exciting CONTESTS
- 8-Page FLIGHT MANUAL
Welcome...
TO THE MOST EXCITING HOBBY IN THE WORLD!

1980—A brand new decade and another exciting year for Centuri model rocketry. If you’ve never flown a model rocket before, you’re about to join the most incredible action hobby ever—Model Rocketry.

Imagine the thrill of watching the rocket YOU built now on the launch pad. After a dramatic countdown, the engine roars to life, and your model soars a thousand feet skyward. You wait anxiously...and then you see the brightly colored parachute blossom and gracefully bring your rocket safely back to Earth for another flight!

NASA enters the 80’s by launching the Space Shuttle “Columbia”—and so do we. Our new “Columbia” kit and outfit enables you to fly the Shuttle even before NASA! Our new powerful Magnum-D’s join the reliable Centuri engine line to send your rockets higher and faster than ever before. The big “Magnum Jayhawk” and “Magnum Hornet” join our new Thunder line of long, lean rockets...one to fit every rocket budget. “Viking” is Centuri’s new creative solution for bargain-conscious school and group rocketry. The new “Club Guide” book by Jeff Fiyare helps get your rocket club going strong.

Other new things to look for include the unique “D-Convertible” kits, 5 new contests, the C.A.T. expanded to include membership for clubs and the World Space Modeling Championship patch offer.

Come fly with us!
HOW TO GET STARTED WITH CENTURI

Start with an outfit

OUTFITS

Centuri outfits and starter sets have everything you need to fly—kit, launcher, engines, and flight supplies, plus easy-to-follow instructions. All you need is a battery, some simple modeling tools and you're ready to begin. Look over the outfit section on the next several pages and get started now.

KITS

There are over 60 to select from including beginner's rockets, multi-stage rockets, military tactical missiles, science fiction, scale models, jet fighters, space ships, boat gliders, payload carriers, and others. Kits do not include engines, glue, paint or launcher.

ENGINES AND FLIGHT SUPPLIES

24 different N.A.R. approved Centuri rocket engines are available plus igniters, chute wadding, shock cords, parachutes and more. Our Magnum-D line of rocket engines are unmatched for high power dependability.

LAUNCHERS

Launching systems (all outfits) are also available separately for when you're ready to move up.

PARTS

Centuri has the largest selection available including custom assortments for both the beginner and the advanced rocketeer. With these parts you can build rockets of your own design.

AGE AND SKILL LEVEL

SKILL LEVEL

The Skill Levels and symbol are shown on all kit pages.

MODEL ROCKETS ARE RECOMMENDED FOR AGE 10 AND UP. Younger children should have adult supervision for both building and flying. Check the skill level number on most kits.

1. SIMPLE TO BUILD—For the beginner with no previous model rocket experience.
2. EASY TO BUILD—Experience in other modeling hobbies—built and flown Level 1.
3. AVERAGE CHALLENGE—Built and flown both Levels 1 and 2.
4. ABOVE AVERAGE CHALLENGE—Staging, boost glider or scale model rocket experience.
5. ADVANCED CHALLENGE—A continued and solid background in model rocketry.

USING THIS CATALOG:

Name: Boldest word/a.
Kit Features Information: Details of flight, performance, building and finishing.
Product number, usually 4 digits.
Subject to change without notice.
Specifications of launch, diameter and weight without an engine.
Numbers from 1 to 5 which show degree of challenge.
Choose your kit, then see the chart on page 38 for recommended engines.

ENGINE INFO

Engine Mount: Holds the engine in place.
Rocket Engine: Safe, non-reusable device. A new engine needed for each flight.

SPECIAL ITEMS

Certain Centuri products are too specialized for retail stores and are available only factory-direct, from Centuri. Some examples in this catalog include: fin units and certain literature in the Publication chart; all are marked "Special Items." To order, include $1.00 for postage and handling, send to Centuri Dept. 305B.

RECOMMENDED BATTERY

6-VOLT LANTERN

FULL ONE YEAR Warranty

Centuri assures your satisfaction with our products. See page 63.

Atypical Centuri kit

Centuri kits, like those of flying model planes, are made from a wide variety of materials. These may be balsa, plastic or paper. Each is chosen for light weight for high altitudes and ease of assembly. For best appearance some painting is required. All kits include a recovery system, and almost all have decals. Tools, engines, paint, glue and launchers are not included. Centuri kits are recognized for high quality, clear instructions, innovative parts design and handsome styling.

How do they fly?

A typical Centuri kit
The best way to start!

EAGLE POWER is our most popular starting outfit and really gets you off to a "flying start" in model rocketry. The big box contains everything you need to fly. All you need is a 6 volt lantern battery and a modeling knife and you're ready for the launch pad! Attach the ignition wires, and prepare for countdown—safety key inserted, your Screaming Eagle rocket streaks skyward—then listen for chute ejection, and see the chute blossom as your rocket begins its descent for another flight. Fly it again and again, and any other Centuri rocket too. You're now on your way as a Centuri rocketeer!

Model Rocket Outfits

Two Big Rockets!

This fantastic starter outfit contains the same equipment you get in the Eagle Power outfit PLUS one of our tallest rockets—EXCALIBUR—an 85 inch "performer" standing over two feet high. Also included is our Rocketeers Guidebook containing everything from A to Z in model rocketry and many photos and illustrations. The almost-ready-to-fly Screaming Eagle Rocket is also included plus the POWER-PAD launch system and four engines. With Big Shot, you have two rockets that you can fly again and again, plus a professional launching system that really gets you established in model rocketry.

Includes:
- Excalibur Kit
- Screaming Eagle Kit
- Power-Pad Launcher
- 4 Engines & Igniters
- Glue & Supplies
- Rocketeer's Guidebook

Prod. No. 5406
$19.95 Skill Level 3

R&D Tip
Kits also sold separately. See pages 10 & 20

The Deluxe Eagle Power Outfit!

$27.17 Value
You Save $7.22

Prod. No. 5404
$14.95 Skill Level 3
**ALIEN SCOUTSHIP FLYING SAUCER OUTFIT**

FANTASTIC! A ROCKET-POWERED UFO THAT YOU CAN FLY AGAIN AND AGAIN!

UFO's are here! Think about the thrill and excitement of walking up to the launch pad with your rocket-powered flying saucer that really flies! Countdown over, the powerful Super-C engine thrusts your alien scoutship skyward to a surprising height. As the thrust phase ends, you watch as your saucer rolls smoothly over to begin its landing descent. And what a beautiful recovery it is—floating down on air, just like the real thing to land gently on its tripod antennas—spectacular! Construction is easy—no tools required, just white glue. "Space-glow" decals including alien emblem let your saucer glow in the dark. Embossed pre-cut fibre surfaces provide authentic realism and ultra-detail for display. Everything needed to fly (excluding glue and a 6 Volt lantern battery) is contained in this revolutionary outfit including mini-manual and our special UFO Tech Report. There ARE flying saucers and this outfit is the beginning!

Prod. No. 5205
$18.95
Skill Level 2

INCLUDES:
- Flying Saucer
- Power-Pad Launcher
- 3 Engines + Igniters
- Mini-Manual
- UFO Tech Report

Tracks straight up with unique center fin "core-tube" stabilization system

**LAUNCH THIS AUTHORIZED REPLICA OF THE MISSILE USED BY THE EARTH'S 25TH CENTURY INTERCEPTOR SQUADRON!**

**EARTH FORCES LASER LANCE**

An easy to build kit that makes a beautiful model, the Laser Lance features pre-colored body tube and plastic nose cone, pre-cut fibre fins and press-on decals in the official Earth Forces colors: royal blue and gold! This sleek model streaks to impressive altitudes with a variety of engine types, then pops a parachute for gentle recovery.

Prod. No. 5224
$14.95
Skill Level 1

INCLUDES:
- Laser Lance Kit
- Power-Pad Launcher
- 2 Engines + Igniters
- Glue & Supplies
- Mini-Manual
- Tech Data

See your Laser Lance streak from its launch pad and almost disappear from sight—then listen for the recovery chute's opening "snap" and watch as the colorful parachute lowers your missile for a safe landing.

**STARTER OUTFIT**

Now you can build and fly an authentic model of Buck Rogers 25th Century Homing Missile. Complete outfit gives you everything you need (less battery) to get started in model rocketry. The Laser Lance kit is all pre-colored with no painting required just like a Kwik-Kit. It's a bird you'll be proud to fly and display in your Buck Rogers collection.

Prod. No. 5202
$3.75
Skill Level 1

**INCLUDES:**
- Laser Lance Kit
- Power-Pad Launcher
- 2 Engines + Igniters
- Glue & Supplies
- Mini-Manual
- Tech Data

**SPECSIFICATIONS**

- Length: 14" (36.8cm)
- Body Diameter: 1.04" (2.6cm)
- Net Wt.: 1.6oz (45.4g)
**Kwik KIts**

**ALMOST READY TO FLY!**

**RECOMMENDED ENGINES LISTED ON PAGE 38**

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**Screaming Eagle**

**THE WINNER!**

Our easiest-to-build, and most popular rocket, “EAGLE,” comes with all parts pre-formed and precut including shiny chrome-stick-on decals. It's a real performer, too, with flights to over 1,500 feet, using “B” engines. Included complete plastic tail and fin section, colored body wrap, plastic nose cone, engine lock, and colorful recovery chute. Ideal for the beginner or group projects.

Prod. No. 5173 $3.75

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**Phoenix Bird**

**OVER 2 FEET LONG!**

The perfect big kit for the beginning rocketeer, Simple, quick construction gets Phoenix Bird to the launch pad in a hurry. Over two feet long, everything about Phoenix Bird is BIG including its 20” recovery chute. Watch a “lift-off” that is slow and spectacular followed by a high flight and gentle recovery. Great for demos and displays.

Prod. No. 5407 $8.00 Skill Level 1

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**Argus**

Prod. No. 5039 $8.00

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**Astro 1**

**IDEAL BEGINNER’S KIT!**

Quickly assembled and easily flown, Astro 1 is our ideal beginner's rocket: An extremely clean design, this classic rocket is simple and fully capable of high-altitude flights. Watch Astro zoom smoothly off the launching pad and return softly under its bright parachute canopy. Pre-cut fins, a rugged plastic nose cone, colorful decals, quick-change engine lock included.

Prod. No. 5047 $4.50

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**Micron**

**FLIGHTS TO 1,500 FEET!**

Micron is extra-easy to build and has big single-stage performance due to its light weight. Colorful streamer recovery gives it soft, safe landing, printed fins and a plastic nose cone plus roll pattern decals make Micron a standout on the launch pad. A great first or second kit that promises real excitement and fun.

Prod. No. 5005 $3.00

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**Sky Devil**

**CUSTOMIZED FINS!**

You can select from 6 exotic fin shapes to customize this high performer. Aero Star Hi-Rak, Delta, Swept Delta, Bastille, Swept-Subsonic or Elliptical. Clean low-drag design plus low weight makes for terrific performance with flights up to 1,800 feet! Comes with plastic nose cone, tail fin pattern sheet, and colorful recovery chute.

Prod. No. 5040 $2.50

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**R&D Tip:**

Also see VIKING on page 35 for Century's lowest priced kit.

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**SPECIAL ITEMS:**

- Phoenix Bird replacement parts
- #5469 PNC-236 cone $1.50
- #5467 F-410L fin unit $1.50

**SPECIFICATIONS**

- Length: 26.3” (66.8cm)
- Body Diam.: 1.34” (3.4cm)
- Net Wt.: 3.0oz (85g)

**Skill Level 1**
**Lil' Herc**

Feather weight tumble recovery!

Learn all about basic rocket flying principles with this easy-to-build rocket that ejects its engine after apogee and tumbles softly to earth ready for another flight! It has die-cut fins, a smooth plastic nose cone and there is no recovery system to pack. Super performance flight after flight!

Prod. No. 5081 $2.00

**Specifications**
- Length: 9.5" (24.1cm)
- Body Diam: 0.36" (0.9cm)
- Net Wt.: 0.86oz (24.1g)

Skill Level 1

**Snipe Hunter**

See-through payload capsule!

Move up to payload rockets with this fantastic performer. Now you can launch incats or inert loads and observe the effects of high acceleration. The payload section is big and a special body reducer is used to keep the power section slim. Kit comes complete with colorful decals, a see-through clear plastic payload section, plastic nose cone, plus a large chute for soft recoveries.

Prod. No. 5403 $4.00

**Specifications**
- Length: 12.5" (31.8cm)
- Body Diam: 0.36" (0.9cm)
- capsule Diam: 0.91" (2.3cm)
- Net Wt.: 0.86oz (24.1g)

Skill Level 2

**Javelin**

Popular beginner's kit!

Especially designed for the beginning rocketeer, Javelin is a real high flyer that is ultra-easy to assemble. On lift-off, the Javelin streaks skyward hundreds of feet—almost out of sight! Kit includes body roll-pattern and fin decals, a brightly colored parachute, precut balsa fins and quick-change engine lock. Great for first-time altitude flights.

Prod. No. 5091 $3.50

**Specifications**
- Length: 12.5" (31.8cm)
- Body Diam: 0.76" (1.9cm)
- Net Wt.: 0.66oz (18.8g)

Skill Level 1

**Moonraker**

Separation at Apogee!

An exciting rocket with lots of action. Two ships in one that separate and fly into two parts. The body of the rocket will tumble safely to earth and the fins will also separate, allowing you to fly them individually as well as together. There are eight fins in total, four on each half. Great for friends who have never flown a rocket before.

Prod. No. 5041 $2.00

**Specifications**
- Length: 18.29" (46.4cm)
- Body Diam: 0.31" (7.9cm)
- Net Wt.: 1.79oz (49.6g)

Skill Level 1

**Groove Tube**

Unusual fin design!

A standout at the launch pad, this different-looking bird flies straight and true, stabilized by a cluster of six "tubular" fins. With a large rocket, too, standing over 1½ feet tall. No balsa to sand, just glue the fin cluster to the body tube, install engine lock and parachute, paint, apply custom decals and she's ready to launch. Keep ahead of your friends with this one.

Prod. No. 5091 $2.00

**Specifications**
- Length: 9.5" (24.1cm)
- Body Diam: 0.36" (0.9cm)
- Net Wt.: 0.30oz (8.5g)

Skill Level 1
**Payloader II**

**STUDY ACCELERATION EFFECTS!**

Sleek single-stage rocket for lofting heavier payloads. A transparent section carries the cargo to higher and higher altitudes as you increase the engine thrust. Stands over 1 ½ feet high. Assembles quickly with pre-cut balsa fins, plastic nose cone, clear cargo compartment and custom decals. Colorful parachute returns sealed capsule and rocket to earth safely.

**Prod. No. 5080 $4.50**

**Specifications**
- Length: 18.5" (47.5cm)
- Body Diam.: 1.2" (2.5cm)
- Net Wt.: 1.2oz (34.2g)
- Skill Level: 2

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**Bandido**

SEALING OR SEATING!

4's jum hot performer to feet for almost-out-of-sight action! The unique wedge-shaped fins (die-cut fibre) help Bandido maximum velocity in a hurry! Return is via a colorful streamer. Chrome trim and custom decals change engie lock and plastic nose cone complete this high performance kit.

**Prod. No. 5007 $4.00**

**Specifications**
- Length: 19.6" (49.8cm)
- Diam.: 0.92" (2.3cm)
- Net Wt.: 1.5oz (42.6g)
- Skill Level: 2

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**Thunder Hawk**

**NEW CENTURY'S LONGEST BEGINNER KIT!**

A great performer, this sleek, long Thunder Hawk is easy to build and impressive in the air with flights to 1,000 feet. Streamer recovery slows the model's descent to a gentle landing. The Thunder Hawk is ideal for beginners and a super quick kit for more advanced rocketeers.

**Prod. No. 5338 $2.50**

**Specifications**
- Length: 21.5" (54.6cm)
- Body Diam.: 0.92" (2.3cm)
- Net Wt.: 1oz (28g)
- Skill Level: 1

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**Thunder Bird**

**BIG, EASY & IMPRESSIVE!**

A great demo bird, the long, thin Thunder Bird is recovered by a large 20" parachute. Two-piece body assembles quickly and easily. Add this big bird to your fleet today!

**Prod. No. 5339 $5.00**

**Specifications**
- Length: 41.75" (106cm)
- Rock Diam.: 1.6" (4.2cm)
- Net Wt.: 2.7oz (77g)
- Skill Level: 2

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**Thunder ROC**

**THE ULTIMATE LONG ROCKET!**

Biggest kit in the Centuri line, Thunder ROC numbers off the pad under Super-C power. Or, remove the convertible engine mount and fly it with a D engine! Two 16" parachutes bring this big bird back for another exciting flight.

**Prod. No. 5340 $7.50**

**Specifications**
- Length: 61.5" (156.2cm)
- Body Diam.: 1.64" (4.2cm)
- Net Wt.: 6.6oz (189g)
- Skill Level: 3
SUPER KITS

Definitely different. Super Kits are out of this world both in appearance and size. These are BIG rockets with special missions. EACH KIT INCLUDES:
- Big 6” x 12” 4-color super detailed decals
- Baffle/chute ejection system
- Rocket Rack display stand
- Dual-chute recovery
- Pre-shaped fins
- Engine Lock

U.S. Patent No. 3,719,145

S.S.V. Scorpion

SATELLITE REPAIRSHIP

This exotic ship’s job is to recover, repair and launch earth-circulating solar energy collecting satellites. Cruising at over 15,000 mph, Scorpion collects satellites using a magnetic tinge-shaped rudder and throws them in special hull slots for later repair. A member of the Satellite Service Vehicle (S.S.V.) fleet, Scorpion performs a vital role in conserving the natural resources of earth in the 21st century.

Prod. No. 5307 $11.50

E.S.S. Raven

SCIENCE FLAGSHIP

Raven is the flagship of the Earth Science Service (E.S.S.), an international organization devoted to monitoring and testing the earth’s ozone layer. Designed to fly to the limits of the atmosphere and return for a wings down landing, Raven’s dual bottom scoop takes in air samples for onboard computer analysis. Sleek and fast, Raven employs the recently announced, faster-than-light propulsion system.

Prod. No. 5312 $11.50

U.F.O. Invader

SUBMARINE SPACESHIP

This alien ship was first sighted in 1985 and has since been tracked electronically and observed by countless eye witnesses. It’s a submarine as well as a spaceship, cruising on either the ocean’s surface or plunging to deep depths to escape detection. Its circular wingspan has sometimes been mistaen for a flying saucer and rumors are that it employs a fuel-less magnetic drive force as yet unknown to us.

Prod. No. 5308 $11.50

R&D Tip

The Rocket Rack included in every Super Kit is also available separately for displaying your other models. See parts section.

Realistic Ramjet Detail

U.S.S. America

PRESIDENTIAL COMMAND POST

Thundering aloft for the first time in 1988, U.S.S. America serves as a Presidential Command Post and operational center. Able to operate in outer space or within the earth’s atmosphere, America helps maintain peace on earth as well as in space. Three large nuclear engines plus six ramjets power this advanced technology giant.

Prod. No. 5310 $11.50
**SCIENCE FICTION KITS**

**From the UFO Fleet**

**Flying Saucer**

This model UFO really flies! Design based on reported sightings. Watch it rise smoothly off the launch pad and streak to surprising altitudes. As coast phase ends, saucer rolls over and starts an agile descent, floating softly down on a cushion of air. Lands on sturdy outriggers to round nest. No chute to break, just float gently to ground. Be the first in your neighborhood to fly this amazing performer. Great for display, too!

- No tools required—just white glue!
- Space-glow alien emblem decals "glow" in the dark!
- High-detail embossed surfaces!
- All parts pre-colored & pre-shaped!
- Fits any launcher!
- Sturdy lightweight fibre construction!

**Specifications**

- **Diam:** 8.125 x 7.244 in
- **Height:** 37/8 in
- **Net Wt.:** 2.4 oz (68 g)
- **Skill Level:** 2

**Prod. No. 213F**

**$6.50**

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**Vector V**

Deep space scientists have discovered a strange new array of alien ships called Vector V. Over 12 variations have been reported. Now you can build and launch your own version using Centuri's detailed plans and an illustrated science-fiction story sheet. Precut fibre fins, plastic nose cone, alien markings decals sheet, large chute and super-detailed makes Vector V a must for your star-ship fleet.

**Specifications**

- **Length:** 12.75 (32.2 cm)
- **Max. Dia.:** 3.25 (8.2 cm)
- **Net Wt.:** 0.9 oz (25.5 g)
- **Skill Level:** 3

**Prod. No. 5032**

**$4.00**

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**Taurus**

2 Foot Long Deep-Space Cruiser!

This interstellar visitor has the look of the future. It is one of our most popular detailed kits that you will be proud to fly or display. Taurus stands over 2 feet tall on the launch pad and thunders aloft to recover gently under a large parachute. Here's what you get: Plastic body reduces, extra-large molded nose cone, simulated cluster boosters, shiny chrome trim, precut fins, Taurian decals, and illustrated science-fiction story sheet and chute for display or ejection.

**Specifications**

- **Length:** 20.75 (52.2 cm)
- **Body Dim.:** 3.25 (8.2 cm)
- **Net Wt.:** 3.4 oz (96.4 g)
- **Skill Level:** 4

**Prod. No. 5033**

**$7.00**

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**Sky-Lab**

Inspired by NASA's Space Station!

Suspended in the blackness of space, moving thousands of miles per hour and rotating slowly, Sky-Lab monitors important earth resources. The space exploration age is here with NASA's flying laboratory. Every detail is included in this spectacular kit. Shiny solar panels, detailed plastic parts, clam shell, huge decal sheet, plastic cones and more. Watch the slow lift off as your Sky-Lab thunders skyward to return gently, suspended by an extractor chute. For a rewarding project, Sky-Lab is the ultimate trip.

**Specifications**

- **Length:** 24.75 (62.5 cm)
- **Body Dim.:** 2.01 (5.1 cm)
- **Net Wt.:** 3.8 oz (105 g)
- **Skill Level:** 4

**Prod. No. 5034**

**$10.95**

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**Laser X**

Prod. No. 5110

**$6.50**

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**Space Pilot**

Lazer Pilot is based on the real Earth and is designed to demonstrate space travel. It is a space station pilot to test a new space technology. The space station pilot is a large space station and is aimed at the Earth. It uses 12 large booster tubes. Lazer Pilot moves smoothly off the launch pad with plastic fins, large clamp, body reducer and a big decal sheet coated with customizing ideas are all included.

**Specifications**

- **Length:** 21.5 (54.5 cm)
- **Body Dim.:** 1.25 (3.2 cm)
- **Net Wt.:** 1.7 oz (48 g)
- **Skill Level:** 2

**Prod. No. 5110**

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**Recommended Engines**

Listed on page 39
**MX-774**

**HISTORY MAKER IN 1/37 SCALE!**

A true scale model of America's first supersonic rocket and one of our highest flyers. This sleek Convair design features a streamlined boattail section, special payload cone, recovery chute and an illustrated scale data sheet. Get in on history, fly high with MX-774!

**SPECIFICATIONS**
- Length: 11.27 (33.6cm)
- Body Diam.: 1.61 (4.1cm)
- Net Wt.: 1.064 (31.2g)
- Skill Level: 3

Prod. No. 5003 $3.50

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**Nomad**

**SUPER DETAILED!**

Looks just as authentic as a U.S. Navy missile. This kit has everything: you need to detail it right down to the access hatches—even the launch attachment lugs resemble a real missile's. Very impressive on the launch pad. Nomad streaks to high altitude and recovers by parachute. Die-cut fins and body varies, shiny chrome bands, a big-2-color decal sheet, and engine lock make Nomad a knock-out.

**SPECIFICATIONS**
- Length: 10.07 (25.6cm)
- Body Diam.: 1.10 (2.8cm)
- Net Wt.: 1.250 (35.6g)
- Skill Level: 3

Prod. No. 5036 $5.50

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**Excalibur**

**OVER 2 FEET LONG! SLEEK AND QUICK!**

Excellent big rocket for the beginner! Over 2 feet long! Excalibur has the sleek lines of a real research rocket yet goes together fast and easy. Features plastic nose cone and body reducer, die-cut smooth fibre fins and the option to customize the upper portion as a payload carrier. Bright reflective chrome trim, large custom decal and big recovery chute finish this spectacular hi-flier!

**SPECIFICATIONS**
- Length: 26.5 (67.3cm)
- Body Diam.: 0.91 (2.3cm)
- Net Wt.: 1.000 (45.4g)
- Skill Level: 1

Prod. No. 5008 $5.50

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**Scram-Jet**

**1 1/2 FEET LONG! STABILIZING TUBES!**

Unique off-center fins highlight this military-styled kit. Scram-Jet has a definite scale missile look. It moves up fast to altitudes of over 1,000 feet—then "pops" a big recovery chute for a gentle recovery. Pre-cut balsa fins, plastic nose cone, big 2-color decal sheet, and engine lock complete this handsome performer.

**SPECIFICATIONS**
- Length: 18.1 (45.9cm)
- Body Diam.: 1.56 (3.9cm)
- Net Wt.: 1.300 (36.9g)
- Skill Level: 3

Prod. No. 5174 $4.50

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**Jayhawk**

**TARGET DRONE ACTION!**

Looks and flies just like the U.S. Navy's AGM-37A missile target drone! High detailing with our big 3-color decal sheet really sets Jayhawk apart. Includes pre-cut fibre "wing," "rudder" and forward "canard" fins plus molded plastic nose cone, parachute, and boat tail. Add decals and Jayhawk is ready for duty.

**SPECIFICATIONS**
- Length: 12.6 (32cm)
- Body Diam.: 0.91 (2.3cm)
- Net Wt.: 1.000 (45.4g)
- Skill Level: 2

Prod. No. 5171 $4.00

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**R&D Tip**

For best performance, use small airscrew and fine plastic截至末尾。
Super Scale Kits

Saturn 1B
1/100 Scale of First Apollo Manned Mission Vehicle
Apollo 7 rose off the launch pad at 11:03 A.M., October 11, 1968, carrying three astronauts first into blue Florida skies and then the blackness of space. The 3-day flight paved the way for the first moon-circling flight.

Unbelievable details right down to the space capsule plus corrugated body wrapper panels, rocket engine nozzles, and the exact markings of the real ship makes Centuri's Saturn 1B a flying scale masterpiece of man's first reach toward the stars. The model is over 2 feet tall and lifts off beautifully on a 2-engine cluster for a dual chute return. Historical booklet and many like-molded parts make this one a "must!" for every rocketeer.

Prod. No. 5140
$17.95
Skill Level 5

Mercury Redstone
U.S. Pat. No. 3,719,145
FIRST U.S. MANNED SPACE FLIGHT ROCKET
In 1961, NASA's Freedom 7 with Alan Shepard at the controls flew higher and faster than any American before – 116 miles up at over 5,000 mph!

REPLICA OF NASA WEATHER RESEARCH ROCKET
A very high flyer and easy to build, this perfectly scaled model stands almost 2 feet tall with a long tapered plastic nose cone. Features unique battle section, system, large parachutes, authentic markings, decals, parts, precut balsa fins and technical data sheet. Build and fly the same day!

Prod. No. 5131
$11.95
Skill Level 5

Nike Smoke {$17.95}$
Skill Level 2

Apollo Saturn V
SCALE SPACE GIANT!
THE "ULTIMATE ADVENTURE" IN SCALE FLYING ROCKETRY FOR ALL AGES!
OVER 3½ FEET LONG!

Prod. No. 5142
$29.95
Skill Level 5

Three-Engine Launch!
Tech Rep included on clustering. Super C engines put the big bird higher than ever!

R&D Tip
Requires 12V ignition and heavy duty launcher (such as Power Control & Power Tower).

12 page historical brochure with many photos included with both Saturns.
**STRIKE FORCE KITS**

FROM TODAY'S HEADLINES

RECOMMENDED ENGINES LISTED ON PAGE 38

---

**Israeli Gabriel Tactical Missile**

A surface-to-surface missile, Centuri's Gabriel is a realistic flying model rocket of the real ship-launched missile from pointed nose to body, guidance fins. Authentic Israeli military insignia and markings plus super-detailed decals make Gabriel impressive on the launch pad and in flight. Balsa nose cone, precut fins, and easy-to-follow instruction help complete the package. Launch to altitudes of over 1,000 feet with the 34C engine and watch the big 14" camouflaged parachute blossom for a safe return.

**Specifications**
- Length: 14.25" (36.2cm)
- Body Diam: 1.36" (3.4cm)
- Net Wt: 1.4oz (39g)
- Skill Level: 3

**Prod. No. 5333 $6.00**

---

**Russian Sam-3 Tactical Missile**

A modified scale version of the famous Russian Surface-to-Surface Missile normally used against aerial targets. Booster tail section looks authentic in detail, but flight requires only a single C engine for altitudes of over 1,000 feet. Camouflaged the missile in dull grey and blue, then paint it with insignia plus authentic markings and you have a beautiful scale-like high flyer that recovers on its own camouflaged parachute. Round out your tactical missile fleet with the Sam-3.

**Specifications**
- Length: 18.5" (47cm)
- Body Diam: 1.04" (2.6cm)
- Net Wt: 1.2oz (34g)
- Skill Level: 3

**Prod. No. 5332 $6.00**

---

**Boeing A.L.C.M. Cruise Missile**

Now you can fly a rocket-powered model of America's most potent strategic weapon! The Boeing cruise Missile is aircraft launched and streaks thousands of miles deep into enemy territory, flying at 550 mph. The real missile is jet-powered, flies on thin swept wings, and is radar-guided with pinpoint target accuracy. Imagine the thrill of striking this very realistic model. Packed on the launch pad with its wings folded, it streaks straight up to unbelievable heights and floats gently back to earth, swinging from a big 16" figure. Easy-to-assemble with a rubber blow-molded plastic body, die-cut plastic wings and fins. Big 4-color highly detailed decal sheet included. Great for display on the colorful floor stand included.

**Specifications**
- Length: 12.3" (31.2cm)
- Net Wt: 2.9oz (79g)
- Skill Level: 3

**Prod. No. 5330 $8.00**

---

**Italian Sea Killer Tactical Missile**

Stylish after Italy's 25-mile range surface-to-surface launched homing missile, the Sea Killer model rocket looks just like the real thing! Authentic military markings and insignia plus precise nose cone, precut fins and new camouflaged parachute. Add the Sea Killer to your flying rocket tactical missile force today.

**Specifications**
- Length: 14.5" (36.8cm)
- Body Diam: 2.09" (53mm)
- Net Wt: 1.2oz (34g)
- Skill Level: 3

**Prod. No. 5331 $5.00**
**FIGHTER FLEET™**

These are realistic jet fighter aircraft models you'll be proud to display and fly! All have a near-scale appearance, yet launch virtually as rockets to return safely via parachute. Clean lines, super detail, and authentic markings make Fighter Fleet a must for every modeler!

**EACH KIT INCLUDES—**
- Clear plastic canopy and detailed cockpit decals.
- Simulated missiles & mounts.
- Simulated fuel tanks with finlets.
- Pre-cut fibre tail, wings, and intake parts.
- Decal sheet with authentic markings.
- Horizontal dive recovery system.
- Detailed data sheet with all specs.
- Scale info on real fighter.
- Quick-change engine lock.

---

**F-16 Fighter**

**Specifications**
- Length: 19\(\frac{1}{2}\) (49.1cm)
- Body Diam.: 1\(\frac{1}{16}\) (3.9cm)
- Span: 7\(\frac{1}{4}\) (17.8cm)
- Net Wt.: 2.0oz (56.7g)

**Prod. No. 6317** $6.00

**Skill Level 2**

---

**F-15 Eagle**

The USAF Air Superiority dual-engine fighter that slices through the air at two and one-half times the speed of sound! During flight tests, the F-15 broke all existing world climbing records. It's a large fighter but comparatively light in weight due to new ultralight space-age metals. All markings are authentic right down to the refueling hatch. Get airborne with this top performer.

**Specifications**
- Length: 15\(\frac{1}{2}\) (39.0cm)
- Body Diam.: 1\(\frac{3}{16}\) (3.5cm)
- Span: 7\(\frac{7}{16}\) (19.6cm)
- Net Wt.: 2.0oz (56.7g)

**Prod. No. 5318** $6.00

**Skill Level 3**

---

**F-4 Phantom**

One of the most versatile fighters in the world, the F-4 is used by the Navy, Marines, and Air Force alike. In Canada and Great Britain, Extremity fell at Mach 2.5, the F-4 flies as a fighter-bomber and can carry up to 15,000 lbs. of bombs plus "Sidewinder" and store missiles. Put this one on the list and get ready for action.

**Specifications**
- Length: 14\(\frac{1}{2}\) (36.8cm)
- Body Diam.: 1\(\frac{3}{16}\) (3.9cm)
- Span: 6\(\frac{1}{4}\) (17.8cm)
- Net Wt.: 2.5oz (70.9g)

**Prod. No. 5319** $6.00

**Skill Level 3**

---

**51 Israeli Mirage**

A French-built Dassault aircraft, the delta-winged Mirage is the mainstay of the Israeli Air Force performing a variety of missions as a fighter-interceptor and close-air support missions. Light and fast, the Mirage can handle a wide variety of ordnance including missiles, bombs, and rockets. Camouflage yours to match the desert and watch it streak almost out-of-sight to return safely by chute.

**Specifications**
- Length: 16\(\frac{1}{4}\) (36.9cm)
- Body Diam.: 1\(\frac{3}{16}\) (3.5cm)
- Span: 6\(\frac{7}{16}\) (17.9cm)
- Net Wt.: 2.0oz (56.7g)

**Prod. No. 5221** $6.00

**Skill Level 3**

---

**F-104 Starfighter**

Currently in NATO service, the Lockheed F-104 is the world's first operational fighter to sustain a speed on March 24! Extremely small and razor-thin wings carry two heat-seeking "Sidewinder" missiles. The actual wing span of the real fighter is only 22\(\frac{1}{2}\) ft! Comes with authentic German Air Force markings.

**Specifications**
- Length: 16\(\frac{7}{8}\) (42.3cm)
- Body Diam.: 1\(\frac{3}{16}\) (3.9cm)
- Span: 6\(\frac{7}{16}\) (17.9cm)
- Net Wt.: 2.0oz (56.7g)

**Prod. No. 5320** $6.00

**Skill Level 3**

---

**ROCKET-JETS THAT FLY!**

The USAF basic Air Combat fighter of the 1980's, F-16, flies over the twice the speed of sound. It's armed with two AIM-9 missiles + 20mm cannon. The model comes with official USAF markings and quick-change engine lock. Vertical fins provide smooth vertical flights. An easy fly-in-one-afternoon project.
**EXTRA-HI FLYING**

**MULTI-STAGE KITS**

Join the high flying fun—go multi-stage!

**Arrow 300**

Big 2-stage action! This slim multi-stage measures over 3 feet long! An ultra-high performer, Arrow 300 streaks to altitudes of over ½ mile. Single, dual, or three-stage flights are possible. Large "United States" decals and 1-2-2 fin decals detail this big bird. Comes with long nose cone, pre-cut fibre fins, 10th recovery chute, and a payload section. Here's real action for the experienced rocketeer!

Prod. No. 5037

$8.50

**STILETTO**

THE HIGHER FLYER!

Stiletto slices upward to reach altitudes of over 1,800 feet! A colorful drogue streamer recovery system helps keep Stiletto "visible" on the long way down as the big booster lumbres safely to earth. Die-cut fins, custom decals, and detailed staging technical report completes this hi-flying package of excitement.

Prod. No. 5031

$5.00

**Arrow 300**

Prod. No. 5037

$8.50

**SPECIFICATIONS**

Length: 37.2" (94.6cm)

Body Diam.: 0.91" (2.3cm)

Net Wt.: 2.6oz (70.6g)

Skill Level: 4

R&D Tip
Centuri's highest flyer when launched with C's.

**Long Tom**

3 FEET LONG!

Get up high with this one! Pulsed skyward on the launch pad this long, slender rocket flies as fast as it looks. Colored plastic body reducer and nose cone, big decal sheet; exclusive battle/chute section (no chute wadding required) and parachute recovery makes Long Tom extra easy to build and fun to fly.

Prod. No. 5064

$8.50

**SPECIFICATIONS**

Length: 35.9" (91.2cm)

Body Diam.: 1.26" (3.2cm)

Net Wt.: 3.2oz (91.6g)

Skill Level: 4

**Black Widow**

THE BOOSTER GLIDES!

A good one to get started in staging and a hi-flier too—over 1,600 feet! Unique Booster has extra-large fins, for a sweeping glide recovery. Comes with plastic nose cone, special decals, pass-port staging system, and large chute.

Prod. No. 5036

$6.00

**SPECIFICATIONS**

Length: 19.9" (50.8cm)

Body Diam.: 0.70" (1.8cm)

Net Wt.: 1.2oz (34g)

Skill Level: 5

R&D Tip
Top stages of all Centuri multi-stages may be flown alone as regular model rockets.

RECOMMENDED ENGINES LISTED ON PAGE 38
Boost Glider Kits

Gliders That Return on Wings!

Historical! Based on old NASA designs, these models feature real Space Shuttle!

Space Shuttle

Fly NASA's Original Concept!

SST Shuttle

Big Dual Ship Action!

Watch this long bird hit-off smoothly and streak high in the air. At apogee, the glider detaches and begins a long flight back to earth. Meanwhile, the slender SST deploys a large chute for a safe, horizontal recovery. Kit includes a big decal sheet and many preformed plastic parts for ultra realism. SST is a challenging project loaded with detailed instructions including "SST Concepts Report". Fly it with the new Super-GI engines for extra high adventure!

Prod. No. 5077 $9.95

Specifications:
- Length: 23.5" (59.7 cm)
- Body Dia: 1.04" (26 mm)
- Net Wt: 2 oz (56 g)

Skill Level 5

R&D Tip
This is our most challenging B/G; has 2 gliding vehicles & recoverable mount.

Earth Forces Starfighter

Now a flying rocket-powered model of Buck's sleek 20th Century Interceptor. Details galore with authentic insignia and markings make it a super display model. Launches vertically to surprising altitudes, then unique rear ejection system pops both engine pod and chute from the tail for safe recovery.

Prod. No. 5335 $6.00

Specifications:
- Length: 13.75" (34.9 cm)
- Body Dia: 0.98" (2.5 cm)
- Net Wt: 3.1 oz (87 g)

Skill Level 3

Display nose slide removes for flight.

Draconian Marauder

Fly the long, exotic Marauder fighter used by Draconian pirates. This needle-nosed intruder features baffle multi-wing system, skull insignia, precut fibre parts and super decal sheet. It soars smoothly in vertical flight to return gently by colorful chute. A stunning display model.

Prod. No. 5336 $6.00

Specifications:
- Length: 17.5" (44 cm)
- Body Dia: 0.71" (2.3 cm)
- Net Wt: 2.0 oz (56 g)

Skill Level 2

©1970 Universal City Studios, Inc.
**Hornet** SLEEK & SWIFT FLYER!

You and your friends will marvel at how fast the sleek Hornet moves off the pad under Magnum D power! Easy to build, the Hornet makes excellent first rocket kits. Plastic nose cone, snap-on decal, pre-cut balsa fins and long 90" streamer recovery make Hornet fun to build and fly.

**SPECIFICATIONS**
- Length: 10.0" (25.4cm)
- Body Dia.: 1.25" (32.3mm)
- Net Wt.: 1.75oz (49.2g)

**R&D Tip**
This kit is a D-convertible. See engine information section.

**New! MAGNUM-D KITS** FLY BIGGER-HIGHER-FASTER!
MOVE UP IN ROCKETRY!

**NEW**

**BONUS** ABOUT MAGNUM-D ENGINES!

---

**MAGNUM-D**

**Jayhawk**
BASED ON AWARD WINNING DESIGN!

Spectacular 1/5 scale model of the U.S. Navy’s AQM-37A target drone, probably the most impressive U.S. missile ever. This massive rocket is over 30 inches long... it's impressive on the pad and in the air. Fantastically detailed, a challenge for all modelers. Special features include molded plastic nose cone, huge precut balsa sheets and 1/16" inch decal sheet (almost a square foot) printed in five bold colors. Magnum D power gives it quite a ride, and two 20 inch parachutes brings it safely to earth, ready for another flight. Designed for the advanced model rocketeer, this kit is a model you'll be extra proud to display and fly.

**Prod. No. 5342**

**$14.95**

**Skill Level:** 6

**SPECIFICATIONS**
- Length: 36.0" (91.4cm)
- Body Dia.: 2.8" (71.1mm)
- Net Wt.: 9.72oz (275.9g)

---

**R&D Tip**
A smaller and simpler sport-scale Jayhawk is also available. See page 21.

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**Recommended Engines Listed on Page 38**
ROCKETRY EXPLORATION

OUTFIT
Power System Outfit
9 complete projects for flying beginning and advancing

ROCKETRY

EXPLORATION

FUN & GROWTH

VIKING

The model rocket project designed for youth groups & schools

NEW

12 rocket kit
Painting not required! All pre-colored parts.

ROCKET PROJECT • MOTIVATING • PROGRAMMED
SESSION • NO EXPERIENCE REQUIRED • SAFE

CENTURI

VIKING 12-PACK—Contains parts for 12 Viking rockets, 12 Assembly Instructions and the Viking Leader's Guide. The Guide is a brief and comprehensive introduction to model rocketry; it explains the building and flying sessions, 3 fun-flying contests and how to cut costs on obtaining a launch system. Buying Vikings in 12-packs costs even less per rocket than by the single kit! (Engines not included)

PROD NO. 5440 $1.75

VIKING 12-PACK—Bargain priced pack of all supplies needed for 12 exciting flights. Includes 12 engines, launchers, instructions and recovery wedges. The A-8 engine is proven to be the best for Viking's first flights; impressive 400 foot altitudes, yet easily retrieved.

PROD NO. 5445 $7.50

ATTENTION, GROUP LEADERS: For volume purchases and other information, please contact: Centuri/Viking

(928) 786-4700

DEPT. 2178, SCOTTSDALE, AZ 85251
All Centuri ENERJET and MAGNUM-D engines are manufactured by automatic equipment to exacting standards. Designed for one-time use; not refuelable or reusable. The N.A.R. emblem on every engine means they are regularly tested and meet all safety standards. We test 3 out of every 100 engines. We strive to provide the highest quality engines available.

HOW A ROCKET ENGINE WORKS

Action-Reaction Principle. At rest, the rocket has equal pressure on all sides. After ignition, the gases escape through the nozzle. This causes a pressure embalance and the engine is forced in the opposite direction from the nozzle. This force is called thrust.

ENGINE CODE EXPLANATION

The letter is total impulse. A higher class letter means more power; B is double the power of A and C is double the power of B, etc.

- The first number is average thrust. This indicates how the average power is delivered. The higher the number, the higher the average thrust.
- The last number is the delay code in seconds. This is the time duration from the end of thrust to the activation of the ejection charge.

1/4A6-4

A6-4

ENGINE SIZE

Centuri's ENERJET and Super-C engines are standard size; they fit most rockets. MAGNUM-D are larger in diameter and only fit rockets with D-size engine mounts. Using L engines requires extra precautions: glue-reinforced engine mount and fin joints, minimum base fill thickness of 3/32", and extralarge launch area.

SELECTING ENGINES

Big rockets need much more thrust to get them off the pad, and a shorter time delay. The drawing below compares a large and a small rocket with different time delays.

The best launch site is one with side dimensions of at least one-quarter the estimated peak altitude of your rocket. Pace off the area to make sure! And don't forget to allow for wind-drift by locating upwind a ways.

COMMON SENSE RULES FOR EXCITING FLIGHTS

1. Launch in areas where you're sure there is no hazard to persons or property. This includes crops or grass that could burn if exposed to hot exhaust gases.
2. Do not fly near power or telephone lines, highways, or other obstacles such as radio towers or air fields. Watch out for “Rocket Eating” trees!
3. Pay attention during your launches to people, aircraft, cars or equipment moving into the launch/recov-ery area.
4. Make a short countdown prior to each launch, to alert spectators.
5. Do not fire your rocket at an angle of more than 30 degrees from the vertical.
6. Keep a clear circle at least 20 feet in diameter around your launch pad.
7. Do not hook up or disconnect the ignition leads until you have removed the safety key. Always keep the key with you so that launching is totally under YOUR control.
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**Note:** Super-C engines are indicated in the columns bordered by two bold lines. Star indicates this is a BOOSTER engine (no ejection charge). This indicates this kit includes parts for flying with standard size or with big engines.

### Engin规格

Centuri Enerjet and Magnum-D engines are sold in boxes with three engines of one type. "Sure-Shot" igniters and complete operating instructions are included.

Twelve boxes of engines of all the same type are sold in dispenser packs. Prices shown below are for one box.
**POWR PAD**

POWR Pad gives you everything you need for launching any single-engine rocket. Designed to attach firmly to any standard 6 volt lantern battery, it includes tilter, steel blast deflector, handy carrying handle, 1/8" 2-piece launch rod, plus launch controller and associated wiring. Launch support platform is made of tough heat-resistant plastic. Assembles in minutes for a permanent launch pad system that you can count on shot after shot!

Prod. No. 5609 $12.95

**PoweR Control**

A heavy duty plastic tripod launcher with authentic detailing. Universal design lets you launch all sizes and types of rockets from minis to large cluster types. Features removable legs, tiltable launch rod, big blast deflector and 2-piece 1/8" launch rod. Assembles in minutes. Great for rocket storage and display. Tool included.

* Requires a Launch Controller such as POWR-CONTROL below.

**LAUNCH ROD**

2-piece 1/8" steel. Use for your own "home-built" launch system or as a replacement part for POWR-PAID or POWER TOWER or others.

LR-128 Launch Rod
Prod. No. 5800
$1.00 each

**POWER TOWER**

A heavy duty plastic tripod launcher with authentic detailing. Universal design lets you launch all sizes and types of rockets from minis to large cluster types. Features removable legs, tiltable launch rod, big blast deflector and 2-piece 1/8" launch rod. Assembles in minutes. Great for rocket storage and display. Tool included.

* Requires a Launch Controller such as POWR-CONTROL below.

**Power Control**

Power Control is the perfect controller for the Power Tower launcher or can be used with any launch stand. Contains 16 feet of igniter line and 5 feet of heavy-duty jumper cable with large color-coded battery clips. Controller contains recessed launch button, continuity light and safety key. Fly the C-powered and cluster rockets with this one.

POWR-CONTROL
Prod. No. 5823
$8.00

**POWR-PAID**

POWR Pad gives you everything you need for launching any single-engine rocket. Designed to attach firmly to any standard 6 volt lantern battery, it includes tilter, steel blast deflector, handy carrying handle, 1/8" 2-piece launch rod, plus launch controller and associated wiring. Launch support platform is made of tough heat-resistant plastic. Assembles in minutes for a permanent launch pad system that you can count on shot after shot!

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**PoweR Control**

A heavy duty plastic tripod launcher with authentic detailing. Universal design lets you launch all sizes and types of rockets from minis to large cluster types. Features removable legs, tiltable launch rod, big blast deflector and 2-piece 1/8" launch rod. Assembles in minutes. Great for rocket storage and display. Tool included.

* Requires a Launch Controller such as POWR-CONTROL below.

**POWER TOWER**

A heavy duty plastic tripod launcher with authentic detailing. Universal design lets you launch all sizes and types of rockets from minis to large cluster types. Features removable legs, tiltable launch rod, big blast deflector and 2-piece 1/8" launch rod. Assembles in minutes. Great for rocket storage and display. Tool included.

* Requires a Launch Controller such as POWR-CONTROL below.

**POWR-PAID**

POWR Pad gives you everything you need for launching any single-engine rocket. Designed to attach firmly to any standard 6 volt lantern battery, it includes tilter, steel blast deflector, handy carrying handle, 1/8" 2-piece launch rod, plus launch controller and associated wiring. Launch support platform is made of tough heat-resistant plastic. Assembles in minutes for a permanent launch pad system that you can count on shot after shot!

Prod. No. 5609 $12.95

**PoweR Control**

A heavy duty plastic tripod launcher with authentic detailing. Universal design lets you launch all sizes and types of rockets from minis to large cluster types. Features removable legs, tiltable launch rod, big blast deflector and 2-piece 1/8" launch rod. Assembles in minutes. Great for rocket storage and display. Tool included.

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* Requires a Launch Controller such as POWR-CONTROL below.
**CUSTOM MODEL**

**Selecting Parts**

For simplicity, all parts numbers are based on seven body diameters. That is, No. 6 body tube fits No. 6 nose cone, No. 6 engine mount, No. 6 connector, etc. Use the body tube guide circles at left to determine what sizes you need. A rocket fin guide (4 or 3 fin configuration) template is also included. Illustrations of the parts are not necessarily to scale. Most information on designing and building your own rocket is contained in the Flight Manual section of this catalog. Always order parts by number and description. Example: 6002 ST-518.

**Diameters**

<table>
<thead>
<tr>
<th>Series</th>
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<th>Outside</th>
</tr>
</thead>
<tbody>
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<tr>
<td>#7</td>
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<td>1,640&quot;</td>
</tr>
<tr>
<td>#20</td>
<td>2,000&quot;</td>
<td>2,040&quot;</td>
</tr>
</tbody>
</table>

**Nose Cones**

Balsa nose cones are machined from high grade light-weight balsa lumber. They require "sand-n-seal" finishing before painting, and a screw eye (not included) for shock cord attachment.

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Size</th>
<th>Length</th>
<th>Price</th>
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<td>6164</td>
<td>BC-200</td>
<td>20&quot;</td>
<td>2.5</td>
<td>2.00</td>
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</table>

**ROCKET PARTS**

**Balsa Tube Connectors**

Solid balsa plugs for connecting payload sections to body tubing when a solid wall is needed.

**Hollow Tube Couplers**


<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Size</th>
<th>Length</th>
<th>Price</th>
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<tbody>
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<td>BTC-13</td>
<td>13&quot;</td>
<td>1.6</td>
<td>.95</td>
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</table>

**Plastic No. Cones**

Plastic nose cones are precision-molded in a wide variety of shapes and sizes. Most have bases with lugs (or eyelets) for attaching shock cords. Plastic cones are ready-to-use in bright colors. May be painted with enamel.

<table>
<thead>
<tr>
<th>Prod. No.</th>
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<th>Length</th>
<th>Price</th>
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<td>6210</td>
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<td>3.2</td>
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</table>

**Airframe Parts**

**Body Tubes**

This is the tubing that forms the rocket body. Use the fin and body tube guide above to determine the correct sizing.

- Heat welded
- Strong
- Lightweight
- Smooth

**Clear Plastic Tubes**

Enlarged payload compartment

**Standard Tubs Coupler Usage**

**Part No. HTC-7CDH is Outer Coupler**

**PLASTIC REDUCERS**

<table>
<thead>
<tr>
<th>Prod. No.</th>
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<td>6368</td>
<td>BR-105</td>
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<td>1.25</td>
</tr>
<tr>
<td>6370</td>
<td>BR-1316</td>
<td>13 to 16</td>
<td>1.25</td>
</tr>
</tbody>
</table>
Engine Mounts

These mounts hold and center the rocket engine in the "Airframe" body tube. They can be adapted to #8, #10, #13, #16 & 20 body tube sizes. You get everything you need including centering discs, engine mount tube, thrust ring and sleeve tube.

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>5966</td>
<td>TR-7</td>
<td>.95</td>
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</tbody>
</table>

Thrust Rings

These featherweight fiber rings are 3/8" long. Used as forward engine stop when glued into any #7 series body tube.

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5970</td>
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<td>.85</td>
</tr>
<tr>
<td>5974</td>
<td>#10</td>
<td>.85</td>
</tr>
</tbody>
</table>

Centering Rings

These rings center the engine tube (#7 in #8 & #10 body tubes).

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5970</td>
<td>#8</td>
<td>.85</td>
</tr>
<tr>
<td>5974</td>
<td>#10</td>
<td>.85</td>
</tr>
</tbody>
</table>

Engine Locks

Includes mylar holding ring and steel lock strip. Keeps engine firmly in place in flight & during ejection thrust.

<table>
<thead>
<tr>
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<th>Desc.</th>
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</thead>
<tbody>
<tr>
<td>5980</td>
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</table>

Launch Lugs

Slender tube glued to side of the rocket. The launch rod passes thru to guide the rocket during launch.

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>5928</td>
<td>LL-3</td>
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</table>

DECALS

White nearly all Centuri rocket kits have their own decals, these below are ideal for tailoring your kit one step further. The sheets are large (approx. 4" x 10") and made in two, three and four rich colors.

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Price</th>
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<tbody>
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<tr>
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</tr>
<tr>
<td>6072</td>
<td>EM-20</td>
<td>1.40</td>
</tr>
</tbody>
</table>

ROCKET RACK

6500       $1.50

This simple-to-build rocket display can be used for display or storage of your rocket. It's super-easy to assemble using pre-cut colored fiber parts and white glue. Fits nearly all rockets.

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
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</thead>
<tbody>
<tr>
<td>36603</td>
<td></td>
<td>.85</td>
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</tbody>
</table>

Miscellaneous

Throut Ring

All parts on this page include illustrated instructions for their use. Look for packages like these.

<table>
<thead>
<tr>
<th>Prod. No.</th>
<th>Desc.</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>36607</td>
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</tbody>
</table>

Centuri PARTS ASSORTMENTS

Design your own rockets!

It's fun and easy, especially after getting some "basic flight time" building several Centuri kits. Centuri model rockets behave just like real rockets and most of the flight principles are the same. Imagine the thrill of seeing your own design lift off and streak skyward. Centuri makes it easy to fly your own designs with two custom parts assortments that are loaded with parts, including our design manual that takes you step-by-step through one successful flight experience after another. Check out the assortments below and set some exciting and rewarding flights.

Beginner's Special

Prod. No. 5454 $11.95

Build 6 complete single-stage rockets with these parts! Ideal for the beginning designer, and it's made easy by the simplified instructions in the Designer's Manual. Just look at what you get:

- 6 Body Tubes (No. 7)
- 6 Nose Cones (Balsa & Plastic)
- 4 Fin Material Sheets
- 1 Fin Pattern Sheet
- 12" Chutes
- 16" Chutes
- Nose Cones
- Sheet Tape Discs
- Body Tube Markings
- Shock Cord Markings
- Thrust Rings
- Launch Lugs
- Rocket: Designer's Manual

$18.95

Designer's Special

Prod. No. 5458 $18.95

Build 8 big rockets with this fantastic assortment of parts. Great for groups and clubs or the serious designer who wants to go higher and faster.

- NOSE CONES:
  - 3 No. 7 Assembled
  - 3 No. 8 Balsa &
  - 2 No. 10 Plastic
- BODY TUBES:
  - 3 No. 7 Tubes
  - 3 No. 8 Tubes
  - 2 No. 10 Tubes
- THROTTLE RINGS:
  - 1 Prismatic Capsule
  - 1 Fin Pattern Sheet
  - 1 Balsa Fin Sheets
  - ENGINE SECTION:
  - 3 Thrust Rings
  - 3 Engine Mounts
- PARACHUTES:
  - 12" Chutes
  - 16" Chutes
  - 20" Chutes
- MISC:
  - No. 8 Connector
  - Sheet Tape Discs
  - Roll Shroud Line
  - Elastic Shock Cords
  - Shock Cord: Fasteners
  - Rocket: Designer's Manual

$33.49

OVER 90 PARTS!
PUBLICATIONS

- COMPLETE!
- 20 PAGES!
- 40 PHOTOS!
- MANY TIPS!
- VERY USEFUL!

POWER SYSTEM HANDBOOK
Seven exciting rocket projects with historical info, flight procedures, engines and construction. 260 illustrations, 24 pages.
Prod. No. 8152 $1.00 (by Flight System Guide).

ROCKETEER'S GUIDEBOOK
The theo basic reference for all rocketeers. Info from "A" to "Z". Richly illustrated with charts & photos. 36 pages.
Prod. No. 8190 $1.25

TECH INFO REPORTS

EDUCATOR'S GUIDE
Teacher's guide for rocketry in the classroom. Includes knowledge tests and suggested curriculum, 64 pages.
Prod. No. 8191 $2.00

SPECIAL ITEMS

ROCKETRY HANDBOOK
Paul Yin & Jim Stowe. Most complete T.R. book ever. 356 ps, 204 ill. #5480
$6.95

SPECIAL ITEMS IN HANDBOOK OF MODEL ROCKETRY
L.T. V. MODEL BOOK
Build and fly space & special effects models, 196 ps. 149 ill. #5479
$7.95

TIR-25 SUPER-C Ensite Tech Rpt. #907,294 (send stamped env.)
N/C

TIR-52 CLUSTERING Tech Report #8190 (free in Sattn)
35¢

MINI-MANUAL: Overview of the hobby #81915 (free in outfit)
15¢

YOUR OFFICIAL MODEL ROCKETRY GUIDE
This publication is filled with basic info to get you started on the right foot in your own model rocketry program. The "F" numbers in the publication chart your official catalog and parts references. Your catalog has many R&D tips which refer you to an "F" number in this FLIGHT MANUAL.

INTRODUCTION
The following is a planned rocketry program which will introduce you to the varied aspects of the hobby. Each step adds new skills and activities. By the time you complete each step of the program, you will be an experienced rocketeer in all the major areas of model rocketry.

BASIC SINGLE STAGE KITS:
Build and launch several single-stage kits to learn basic rocket construction and recovery devices. These are good choices:

1. Screaming Eagle... Parachute
2. Astro-1, Javelin... Parachute, brass parts
3. P.B., X-7... Parachute, brass parts
4. L'il Herc... Tumble
5. Micron... Streamer
6. Flying Saucer... Drag Recovery

ROCKET STABILITY: (F7)
Read Centuri's TIR-30 technical report to learn what makes a rocket fly straight. "What is the Center of Pressure," and "How to test for stability".

PAYLOAD LAUNCHING: (F8)
Launch a standard payload weight to determine the effects of weight on model rocket flight. Use payload models such as:

Sniper Hunter Payload (Power System X-16)

MULTI-STAGE: (F8)
Build and launch one of the multi-stage kits to learn techniques during stage separations and upper-stage ignition, such as:

Black Widow Excelsior Power System X-7
Arrow 300 Long Tom Stiletto

CALCULATING ROCKET ALTITUDE:
Read Centuri's TIR-100 technical report to learn how to figure the altitude of your models before you fly them. Learn how to select the proper delay time for different models.

BOOST GLIDERS: (F9)
Build and fly one of the following models to learn the basics of rocket gliders:

Space Shuttle SST Shuttle Mini Dactyl

CLUSTER IGNITION: (F10)
Build and fly multiple-engine rockets to learn the techniques involved in flying cluster models. Saturn V, Saturn IB, Power System X-16

*All the elements of the program marked with an asterisk can be found in the Centuri Rocket Exploration Power System Outfit.

CUSTOM DESIGNING:
Use the Centuri Design Manual and Parts Assortments to create an original design.

F1 TOOLS & MATERIALS

WORK: Choose a work area that is well-lighted. Area ventilation is necessary to avoid fumes. Tools and materials must be organized and ready for use.

GLUE: Different glues are required for different jobs. White glue or Paralene glue (such as Wilhold glue) are for joining porous surfaces (wood and paper). Plastic resin and liquid plastic are for plastic, although they work in different ways. Plastic resin actually forms a link of plastic between the two parts while liquid plastic "welds" the two parts together. Sometimes you may even use epoxy or super-strength cyano-acrylate glues, but be careful! Once these strong glues are applied they are tough to get off.

KNIFE: A modeling knife is an invaluable tool. A good knife like an X-ACTO knife will come in very handy, but keep a good, sharp blade in it.

SCISSORS: You will need scissors to cut out paper parts and shroud lines. Get a good pair and keep them in good working order.

SANDPAPER: A selection of different grits of sandpaper will help you do a good job in shaping brass parts like fins and wings. Grits of 120 to 300 are the most commonly used.

BRUSHES: Get a large and small brush of good quality so that the bristles don't fall out after use.

BODY: Body tubes are made of paper with a special glassine coating that gives them a smooth finish and makes them stronger. Many models will fill the spiral seam lines in body tubes by painting them with sanding sealer or brass filler coat.
Balsa: Balsa is used to make nose cones, transition sections and fins. Balsa grain needs to be filled with an appropriate filler, such as Hobby or Fix Vinyl filler.

Plastic: Plastic parts may include nose cones, fins and the main body of the rocket. Plastic is lightweight, strong and easily cut and shaped.

Fibre: Fibre-board, a kind of thick cardboard can be used to make fins. Almost as strong as balsa, it does not need to be finished because it has a smooth surface which can be painted as is. Edges may need a glue seal.

**F2:2 CONSTRUCTION TECHNIQUES**

**A. FINS**

Select a fin shape and draw it on to a piece of card stock to make a fin template. Cut out the template and trace the pattern on to the balsa sheet, making certain the grain in the balsa runs toward the side of the fin which will be glued to the rocket (root edge).

Balsa is soft and easy to cut, but a few basic rules must be followed to get consistently good results.

- Use a straight edge to guide the cutting and always use a sharp knife. Hold the knife straight and cut in several light passes. This results in a neat cut with less dulling of the blade. Hold knife as shown for best results.

Before attaching fins to the rocket, sand all fins to the proper shape. Place them together and even up the edges with a sanding block or by running them over a sheet of sandpaper held flat on your work surface. Lightly sand the surfaces of the fins and round the leading and trailing edges.

Mark the body tube by placing it over a fin location and alignment guide. Extend the lines parallel with the long axis of the body tube by placing the tube on a sheet of sandpaper held flat on your work surface. Lightly sand the edges of the lines and round the leading and trailing edges.

D. FINS CONES

Sometimes it is necessary to correct the fit of cones and payload sections because they are too light or too loose in the body tube. For a balsa nose cone, sand the base of the nose cone slightly if it is too light. If the nose cone is plastic, peel away the inner layers of paper inside the body tube. If the nose cone is too loose, add a wrapping of two of masking tape to the base of the cone. It should fit snugly but not so tight that it will fall off when the rocket is activated.

**B. ENGINE MOUNTS**

There are basically two types of engine mounts, shown below. One uses two solid rings which hold the engine tube in place, while the other uses two thinner cardboard rings supported by a tab through the center. Both are effective engine mounts. It is usually a good idea to use an engine lock wherever possible, because this means you can change engines quickly without tapping for a tight fit. You can add an engine lock to any engine mounted in a size 10 tube or larger by simply cutting a small slot in the engine tube below the thrust ring to accommodate the engine lock. Also cut a slit in the lower ring. The lock will serve to hold the lock in place. You may want to use a mylar lock ring for the purpose as shown. These are supplied in Centuri engine lock packages.

**C. LAUNCH LUGS**

It is important that launch lugs be glued on correctly because they help to guide the rocket for the first three feet of its flight. Always check the alignment of the lugs carefully, especially if there is more than one lug. You can use a spare launch rod to be certain the lugs are properly aligned.

**D. NOSE CONES**

Sometimes it is necessary to correct the fit of cones and payload sections because they are too light or too loose in the body tube. For a balsa nose cone, sand the base of the nose cone slightly if it is too light. If the nose cone is plastic, peel away the inner layers of paper inside the body tube. If the nose cone is too loose, add a wrapping of two of masking tape to the base of the cone. It should fit snugly but not so tight that it will fall off when the rocket is activated.

**E. SHOCK CORDS**

Shock cords absorb the shock of impact and also line the body of the rocket with the nose cone and recovery device. There are many ways to attach shock cords but here are two easy and effective ways.

**TUBE-SLIP METHOD**

Cut two slits clear through the tube far enough down the tube so that the shock cord attachment won't interfere with the nose cone. Slip the shock cord through, slide the shock cord to the end and push the paper back in place. Apply glue to the outside of the attachment.

A model rocket that has a good finish on it and is impressively painted will become a show piece. A good finish is easy to create, and only takes a little practice. The techniques listed below will help you get a good finish every time.

**A. FINISHING Balsa**

All balsa parts have wood grain which must be filled with a specially prepared filler before painting. If this is not done, unattractive grain will appear through the paint.

- Lightly sand the balsa surfaces with fine sandpaper. Apply two coats of filler, allowing each coat to dry about 45 minutes. Sand the balsa surfaces thoroughly and apply another coat. Allow to dry and sand again. Continue the process until the desired surface is obtained. You will find it doesn't take very many coats to get a glass-smooth finish.

**B. PAINTING**

You can use either enamel spray paint or butylate dope to paint model rockets, although the spray will produce a quicker, tougher and better looking finish. You may apply enamel over dry butylate dope, but NEVER apply dope over enamel, as it will completely ruin the finish.

- We recommend that you use a good quality enamel spray paint: Spray painting property requires a bit of patience and practice. Always hold the spray can about 12 inches away from the model, and spray with even passes of the can. Don't try to paint the rocket in one coat; use two or three light coats to prevent sag, runs and sags. If you wish to use more than one color, apply the lightest color first and allow this coat to dry thoroughly—at least 24 hours. Then mask off the areas you want to stay that color and apply the next lightest color. Continue the process until you have applied all colors to your rocket, then remove the tape carefully.

- Masking is an art in itself, but it is not difficult once you try it a few times. Use a good quality masking tape and apply it carefully. You can
C. DECALS
Decals should be applied with care so that they will last the life of the rocket. Make sure the surface is clean and the paint is dry. Smooth the surface so it will stick. Follow the decals instructions for soaking the decal, and avoid touching it with fingers when applying it. As it dries, your fingers may interfere with the decal sticking properly. Do not apply the decals carefully to remove all air bubbles and allow to dry overnight. Then cover with a clear enamel spray to protect the decals.

F:4 ENGINE INFORMATION
See your Centuri catalog’s engine section.

F:5 RECOVERY TECHNIQUES
The recovery system is one of the most important parts of a model rocket. It is the part that will keep your rocket safely on the ground ready for another flight. Few models can spend many hours on a model, only to be damaged by improper recovery on its first flight. In this section we will describe the major types of recovery systems and give you some tips on how to use them.

A. TYPES OF RECOVERY SYSTEMS
Parachute: Parachute recovery is the most common form of recovery system. A parachute will open over the rocket, slowing the descent to a soft landing.

Streamer: A streamer is a long, narrow piece of plastic, paper, or mylar which unrolls at sustained altitude and creates drag as it passes through the air. It slows the rocket down for a safe recovery. Streamers work well in small diameter lightweight models.

Tumble: Tumble recovery is used on very light models. The engine is ejected, changing the stability of the model and causing it to tumbling safely back to earth.

Boost-glider recovery: A boost-glider engine returns to earth by glide recovery, usually ejecting the engine along with a power pod that is recovered by parachute or streamer.

B. PACKING PARACHUTES
There are many ways to pack parachutes. If you examine some of the model rockets you are most likely to find that there are two basic ways to pack parachutes. The first is to pack it as a loose bag. This is the most common method, and it is the one which is shown here. The second method is to pack the parachute as a compact unit. This is the only method which is shown here. The parachute should be folded and packed prior to launch, to avoid remaining folded in descent.

A streamer is simply formed into a roll and inserted into the body tube. At elevation it will unroll and deploy. Be sure to pack it just before launch so that it is not fully unrolled or left in the body tube too long.

If you fly in extremely cold weather, you may have to pack the parachute devices to keep them from "setting." Plastic which is left in a cold temperature has a tendency to stick together. You can prevent this problem by using chafe powder on the parachute. This will make the surface smooth, and prevent it from sticking.

The amount of wadding used in the rocket is important. Follow the directions on the package for your first few flights. Soon, you will get a "feel" for how much to use. Remember that the amount of wadding is less important than the volume it fills up. It should be loosely packed but still protect the recovery device.

If your nose does not come down fast enough with the parachute you are using, there are several ways to change the descent rate.

1. Use a smaller parachute.
2. "Reel" the shroud lines with masking tape.
3. Cut a "spill hole" in the center of the chute.

F:6 FLIGHT PREPPING
A. LAUNCH SITE CHECKLIST
These are items you should bring with you every time you go to fly model rockets.

B. BASIC RULE OF STABILITY
All you need to know about stability is when your rocket is in flight, it must always have the Center of Gravity (CG) ahead of the Center of Pressure (CP).

STABILITY TEST
An easy way to test for stability is the "swing test." Get a stick or rod (about 1" in diameter) and tie it to the balance point of your rocket. Now swing the rocket around your head, watching it as it swings. If the rocket spins right in the direction of flight, it is stable. If it doesn't, try it until you have made at least one of the following corrections:

1. Add weight to the nose (moves the CG forward).
2. Add weight to the tail (moves the CG back).
3. Once you have made your corrections, test your model again. If it is still unstable, make further corrections.

The "swing test" sometimes causes rockets to be "over-stabilized." Some Centuri kits won't quite pass the test, yet all are very stable in flight.

C. PERFORMANCE
While there are many factors affecting the performance of a model rocket, few of them can be controlled in order to increase performance. Rotational forces (pitch, yaw, and roll) are the result of air acting on the rocket and (except for roll) cannot be controlled. Gravity is the same regardless of how we think of it, so matter where we fly on the Earth, so that leaves us with thrust and lift. Thrust should be increased by using a more powerful engine, but to increase the performance of the model itself we can only increase the lift. How can we increase lift? What are the forces which affect lift? The drag on a model rocket can be expressed as follows:

\[ D = \frac{1}{2} C_d A P \]

Where

- \( D \) = Drag on Rocket
- \( A \) = Frontal Area
- \( V \) = Velocity of Rocket
- \( D \) = Density of Air
- \( C_d \) = Drag Coefficient

This looks more difficult than it is. All this equation says is that drag is affected by the frontal area of the rocket, the speed at which it is traveling and the density of the air through which it travels. What more, it tells us that the velocity of the model is the most important factor: as velocity goes from 100 feet per second to 200 feet per second, drag goes from 10,000 units to 40,000 units (the square of the velocity).

Of all these factors, only two are easily controlled: Air density is fairly constant, and velocity depends on the size of the engine, the weight of the model and other factors. That leaves us with frontal area and drag coefficient.

Drag increase or decrease directly with frontal area. If we decrease frontal area, we decrease drag. There are a number of ways to decrease frontal area: Use a smaller body tube size, use no transition sections, reduce the number and size of fins. However, we must always be careful when changing parts on a rocket that we keep it stable in flight. To get the best performance from your rocket, a good general rule is to use the smallest diameter body tube and smallest size fins THAT WILL GIVE YOU ADEQUATE STABILITY!
Another way to reduce frontal area on your model rocket is to give it a smooth finish. Finishes that have bumps and chips in the paint, rough edges or grain showing through on balsa surfaces present a great deal more surface area to the oncoming air and therefore have more drag. Strive to get a super-clean finish on your model by following the tips in the section on finishing in this manual.

One particular type of drag that can be greatly reduced by the modeler is called induced drag. Induced drag is the drag which results from the attitudes at which the model “attacks” the air or objects on the surface of the model and directly causes the production of drag. One type of induced drag is caused by high angles of attack (see diagram). If the model is not pointing in the direction of the flight, it presents a much greater surface area to the air and drag increases. High angles of attack occur when a model wobbles through the air. You can reduce this problem by making your model more stable—add more nose weight or increase fin sizes.

The rocket’s launch lug can also be a major source of drag. In fact, studies have shown that it can account for up to 30% of the total drag on the model. You can help reduce this drag by trimming the launch lug to a streamlined slope as shown below.

One of the most important ways to help cut drag is to use rounded shapes. While sharp angles and pointed shapes may look like they give better performance, studies have shown that at the speeds at which model rockets fly, rounded shapes have the least drag. This brings us back to the last factor in the drag equation—the drag coefficient.

The drag coefficient (C_d) is a dimensionless factor that brings into the equation some knowledge about the shape of the model. The less streamlined the model is, the higher the drag coefficient. Every part of the model rocket has a drag coefficient of its own, even nose cones.

### F-8 multi-staging

**A. WHY MULTI-STAGE?**

Using more than one stage on a model rocket generally increases its useful range. Two engines which fire in succession will often carry your rocket higher than if you clustered them in a single stage. It is important to understand how multi-staging works before trying this complex model rocketry technique.

**B. HOW PASS-PORT® STAGING WORKS**

*U.S. Patent No. 3,721,193*

The lower stage of the rocket contains a booster engine, which fires in the direction of the nozzle of the upper stage engine. While the upper stage engine propels the rocket upward, the lower stage engine provides the necessary lift. The lower stage engine is ignited at the beginning of the flight, just as the rocket is about to enter its ascent phase. The lower stage engine provides the necessary lift to achieve the desired altitude for the upper stage engine to work properly.

As the engine fires, the propellant burns until a very small amount of propellant remains in the booster engine. When this thin wall breaks, hot particles of propellant are thrown forward into the nozzle of the upper stage engine, igniting it.

In the Centuri Pass-Port Staging System, some of the rapidly expanding gases which contain particles of propellant from the booster engine are allowed to escape through 2 ports in the coupler joining the stages. This allows a split second to ignite the next stage before the first stage drops off.

The first stage alone is an aerodynamically unstable body that would tumble or glide safely to Earth. Meanwhile, the second stage climbs with the thrust of a second stage engine adding a boost to the power of the first stage.

**C. CHOOSING THE RIGHT ENGINES**

When using a multi-staged model, ALWAYS use only one booster engine in all but the upper-most stage. Generally, it is not wise to fly a rocket with more than three operable stages, as the safety factor of 4 or more staged rockets goes down dramatically. The upper-stage engines should be of the standard type, with a delay and ejection charge to activate the recovery system. In most cases, the delay charge should be of greater duration than with a single stage rocket, since the velocity of multi-staged models is much greater and they therefore need more time to coast to peak altitude. Booster engines are almost never used in non-staged rockets, except in special cases such as the Century Flying Saucer and X-24 Bug kits.

**D. DESIGN AND CONSTRUCTION**

When mounting engines in multi-staged rockets, follow the example shown here. Each stage must be fitted with the special "Pass-Port" coupler (HTC-3C0M) in order for each stage to work properly. In rockets with larger body tubes than number 7 each stage should be fitted with a stage coupler for that size tube. Best performance will be obtained using a number 10 tube.

**E. STABILITY**

Multi-staged rockets need to be stable just like single-stage rockets. To weight in the rear of the model means you will need greater fin area. Check each section of the rocketer separately, starting by doing the "swing test"! For uppermost stage, then add each stage one at a time and checking stability.

**F. RECOVERY**

Because multi-staged rockets fly to very high altitudes, then have a greater tendency to drift. Try using a streamer or parachute with a spool to reduce drift. Never fly multi-staged rockets in high winds as they have a tendency to fly away from the wind and may end up a long way from the launch site.

**G. SPECIAL FLYING PRECAUTIONS**

1. Be sure to use booster engine types in each booster stage.
2. Use an engine with a delay and ejection in the uppermost stage.
3. Never use a standard engine in the booster as this will almost certainly cause a crash.
4. Be sure all engines have their nozzles pointing rearward.
C. DESIGNING A GLIDER

You can design your own pop-pod boost glider using the parameters given below. When designing any glider, start by selecting the area of the wing. From this area, the other dimensions will fall into place. The chart below will give you a rough idea of how much wing area to use for any power engine.

**ENGINE TYPE**
- WING AREA
  - A: 0 sq. in.
  - B: 30 sq. in.
  - C: 40 sq. in.
  - D: 60 sq. in.

The area of a rectangular wing is equal to the length times the width, (chord). Choose a dimension for one side, plug it into the formula and it will give you the dimension for the other side. (Ex. for A glider, A = 20 sq. in. If the wing is 2 inches wide, then it is 10 inches long.)

From these dimensions we can get the other dimensions of the glider. The area of the horizontal stabilizer is equal to 1/3 to 1/4 of the wing area. The rudder should be 1/10 the wing area. Determine the dimensions of the span and chord of each of these pieces as you did with the wing, by choosing a dimension for either span or chord and plugging it into the formula to get the other dimension.

Now we have dimensions for all the surfaces of the glider. The body length is determined by "flattening" the remaining two portions we still don't know (see diagram). Stab. chord is equal to 2 times the wing span, "m" is equal to 2 times the stab. chord, and wing chord.

Finally, we need to determine dihedral, which is the angle between wing panels. This is equal to 1/8 of the wing span for each side. As you can see, there are a number of ways to form dihedral. The small V type is the easiest to make, but try different kinds.

**MORE ACTIVITIES**
- Get involved in model rocketry by joining a local rocket club. You should also join the National Association of Rocketry (NAR) for more extensive rocketry activities.
- Join the Centuri Aerospace Team (CAT)—Centuri's special club for customers who want factory direct info on special offers and products.
- Build and fly more Centuri kits, increasing your abilities by advancing upward through higher skill levels.
- Design your own rocket—Centuri's Design Your Own Rocket kit line can help keep engine exhaust off of the wing. This should be at least 1/2 to 3/4". Make sure the pod will come off smoothly at ejection, but limit so it stays off before launch.

Make sure you trim your glider before launch. Small bits of clay can be added to correct for stalls and to make the glider turn left or right.

**F:10 CLUSTERED ENGINES**

Sometimes a single engine is not enough to launch a large heavy model. Clusters of several engines are used to accomplish this task. Remember that when engines are clustered, they should be close to each other and should be balanced around the centerline of the rocket.

- 2 engine mount in #16 tube
- 3 engine mount in #16 tube
- 4 engine mount in #20 tube

When igniting a clustered model you should always use a 12 volt car battery to ensure sufficient current to ignite all the engines. You should always use Servo-Snap Igniters and a cluster clip whip. A clip whip can be made from regular 18 gauge wire and micro clips. Each clip should have as many leads as you have engines to ignite. Each one lead from each clip whip to each igniter and make sure none of the clips touch each other.

**M:11 ON YOUR OWN**

The United States will host the 1980 World Space Modeling Championships July 7-12 in Lakehurst, NJ, at the Naval Air Engineering Center. The WSMC, the ultimate test of model rocketry skills, is the first ever held in the U.S. The earlier three were in Eastern Europe.

The WSMC is run like the Olympics with non-professional contestants and no government funding for the U.S. Team. Centuri and other aerospace companies are helping the NAR sponsor the meet. You can help by buying a team patch. All net proceeds are donated to U.S. team and meet expenses.

Team members were selected last August to allow a year for training. This is by far the most important model rocketry competition ever held in the U.S. Please help to make it the best ever. Everyone is welcome to attend. Centuri will be there. Who are you in Lakehurst?
Design Contest

You could be a winner in Centuri's Design Contest. Build your own imaginative rocket from Centuri parts.

Contest Rules
1. Entries must consist of a photograph of the model and a drawing which includes a parts list and your name and address.
2. Entries must be flown worthy and not copies of kit designs produced by model rocket manufacturing companies or other published designs.
3. Entries become the property of Centuri and cannot be returned.
4. Employees of model rocket companies and their families are not eligible.
5. Entries judged on originality, neatness and completeness.
6. Do not send the actual model.
7. Send in as many different entries as you like, but no duplicates.
8. There is no deadline. A winner is selected twice yearly and notified by mail.
9. Specify which prize you want.

Prize
The winner will receive a prize of his or her choice: any one product from the current Centuri catalog! It can be any model rocket product we have — right up to the fantastic Saturn V kit or Power System Outfit!

Tips
- Choose from available parts.
- Avoid large forward fins.
- Use your imagination.
- Make your entry clear and readable.
- Take your time and do a good job.
- Don't forget the Photo!

Here are this issue's winning entries:

Comet
Assembled & designed by HENRY WIEZOREK, Bayonne, NJ

The Comet is a 24-gger.

Front View

Other Parts:
LL-3
LL-6
EM-13
CP-20
SC-18
SC-18
3/32" Balsa
3/32" Balsa

Fin A
Fin B
Fin C
Fin D
Fin E
Fin F
Fin G

PNC-76
PNC-89
PNC-89
PNC-89
PNC-89

Make 2
Make 3
Make 2
Make 3
Make 4
Make 4
Make 4

1/3" Lath
1/3" Lath
1/3" Lath
1/3" Lath
1/3" Lath
1/3" Lath
1/3" Lath

1/2" Balsa
1/2" Balsa
1/2" Balsa
1/2" Balsa
1/2" Balsa
1/2" Balsa
1/2" Balsa

CL-799

Centuri

Photo Contest

Maybe you will win a "Buck Rogers" kit!

Here's your chance to become a contest winner and receive a valuable prize. Just follow the rules and match each photo with the correct TV show title on the form below. The first 20 correct entries will receive their choice of Centuri's Buck Rogers kits.

20 Prizes!

Tim Preinest of Akron, Ohio is the winner of the Photo Contest. His carefully done photo depicts a Centuri U.S.S. America in a seeming fly-by of one of Jupiter's moons.

You can enter this ongoing Photo Contest and try for the prize, a $10 Centuri Merchandise disc certificate. A winner is picked for each year's issue of Rocket Times. Send in your best photo about model rocketry addressed to: Photo Contest, in care of Centuri Rocket Times. Try for good contrast and sharp focus. Remember that people in the picture make it more interesting for our readers.

Cartoon Contest

This issue's Cartoon Contest winner is Charles Poole, Jr., from Muskegan, Michigan. Charles "Mystery Prize" is a giant full color NASA poster of the Viking mission; now a collector's item.

Want to see your cartoon published? Just draw a funny cartoon about model rocketry and send it to Cartoon Contest, in care of Centuri Rocket Times. Each issue we pick the one most suitable for publication and award a different "Mystery Prize."
Join us on the Centuri Aerospace Team

C.A.T. NEWS

HERE'S 10 GOOD REASONS TO JOIN THE C.A.T. NOW!

1. Your own copy of the next Centuri catalog, sent automatically.
2. The chance to enter and win C.A.T. contests.
3. The chance to be in the catalog.
4. C.A.T. DATA FORM
   Probably the most important part of your C.A.T. kit! Complete this simple form about your model rocketry activities to become eligible to have your photo in a future issue of this catalog.
5. IRON-ON SHIRT INSIGNIA
   A large 6¼” x 7¼” three-color emblem for your T-shirt or jacket. Easily iron-on and remains permanently. You'll be proud to identify with other Rocketeers.
6. MODEL ROCKET DESIGN MANUAL
   Worth $1.25 by itself! Large 8½” x 11” book contains 35 illustrated pages. Explains design tips, construction techniques, plus photos of plans and over 100 diagrams.
7. C.A.T. DECAL SHEET
   Impressive 3-color decal containing 16 Team insignias. Measures 3¼” x 5¼”. Colors are red, white, and blue.
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   A beautifully lithographed certificate with your name inscribed and ready for framing.
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    Apply this colorful I.D. sticker to your notebook, bicycle, car, field box, or even your rocket.

C.A.T. CLUB MEMBERSHIP

Now 3 or more rocketeers joining the C.A.T. at the same time can also get the special Club Membership Kit for only $2.50! This Kit includes certificates with your club name, current catalog and these 3 popular books for your club library: Club Guide, Rocketeers Guidebook and Power-System Handbook. To qualify, at least 3 must join the C.A.T., using the same envelope.

C.T. NEWS

"ROC" CONTEST

20 BIG PRIZES!
We invite members to enter our newest C.A.T. contest: It's fun and easy! Our new "Thunder Roc" kit is named after the Roc, a giant fierce bird from Arabian mythology. Just draw a picture of what you think the bird might have looked like. The 20 entrants with the most original and the neatest looking Roc's will each be awarded a Centuri "Thunder Roc" kit.

THUNDER ROC

Enter as many times as you like. The deadline is December 1, 1980. Send to: "ROC" Contest care of Centuri C.A.T. Director.

"L.F.O. EMBLEM" CONTEST

REVIEW SUGGESTIONS

"L.F.O. EMBLEM" CONTEST WINNERS

Thanks to many C.A.T. members who sent in entries to the "L.F.O. Emblem" Contest. The 20 winners listed below each received a Centuri Flying Scale Kit.

TOM ELAM, Maysville, PA
BARRY TARZIN, New York, NY
PHILIP BUCK, Knoxville, TN
MARK IRVIN, Sterling, OH
MARK LEMAN, Clinton, LA
DOROTHY WINTER, Phoenix, AZ
ANDY BURTT, Colorado Springs, CO
ANGUS G. BENTLEY, Winthrop, MA
JERRY BUSHNELL, Waco, TX
G. J. SMOTHERS, Rehoboth, NY

C.A.T. PRICING

$4.00 VALUE only $2.50

You may use a facsimile of coupon, to avoid cutting your catalog.
ROCKET ACTIVITIES

Everyday we receive letters from rocketeers asking how they can join a nearby club. Here are our recommendations.

Schools & Clubs

1. These are some of the organizations which have model rocketry programs. Check in your community.

Schools

- Youth Centers
- Vocational Training Camps
- YMCA/YWCA
- Kiwanis
- Scouts
- Lion's Clubs
- Boy's Clubs
- Civil Air Patrol
- 4-H

2. Ask your local rocket dealers. Look in the yellow pages under "Hobby and Model Construction Supplies".

3. Ask at nearby schools. Many schools are school-affiliated clubs.

4. Form your own club following the Centuri Club Guide.

5. Join the N.A.R. If you are a member you may ask for a list of N.A.R. sections (clubs) and members in your area.

The National Association of Rocketry is the official nonprofit organization for model rocketry. Open to all serious rocketeers, membership includes competition book, license, insurance, decals and monthly magazine. The NAR establishes safety rules, certifies records, publishes technical materials, and promotes model rocketry. See address below (other addresses are of similar organizations outside U.S.)

NATIONAL ASSOCIATION OF ROCKETRY
P.O. Box 775, Dept. C-58
Newark, New Jersey 07106

CENTRAL ASSOCIATION OF ROCKETS
P.O. Box 10, Dept. C-4
South Bend, Indiana 46629

Ottawa, Ontario K1P 5A1, Canada

1st Class Mail 1st Place

Ottawa, Ontario K1P 5A1, Canada

Send for a huge 13" x 26" version of this "Model Rocket Headquarters" wall poster. Only $1.50 (prod. #907-382). Use the handy coupon on page 62.

FULL ONE YEAR WARRANTY

Your Centuri product is warranted against defects in materials or workmanship for one year from the date of the original purchase. Any Centuri product which fails, because of a manufacturing mistake, malfunction or defect in material, will be repaired or replaced, at Centuri's option and at no charge to you. This limited warranty is provided to you in lieu of all other warranties, expressed or implied.

This warranty does not cover any unauthorized modifications or alterations by the owner. Any attempts to repair the product by unauthorized repairmen will void this warranty.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

For repair or replacement under this warranty, please return the defective part of your Centuri product with proof of purchase to Centuri in care of Consumer Relations Department.
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Complete Starter Set (less battery) has everything for your first three thrilling flights. The COLUMBIA, at nearly one foot long, is a great display model between missions! Get into rocketry with Centuri’s only outfit featuring a scale-type model of a real spaceship!

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