

JUDGING NAR SPORT SCALE

by Peter Alway

(Peter Alway is the author of *The Art of Scale Model Rocketry*, *Rockets of the World*, and *Retro Rockets: Experimental Rockets 1926-1941*. He has judged youth and team division scale and sport scale events at six NARAM's.)

What makes a good scale model? Most NAR contest events are scored by measurements of time, altitude or distance, but the craftsmanship events require judgment calls. Don't assume they won't be your calls. If you are the only one at a contest without a scale model, you just might be drafted to judge.

While the NAR Sporting Code (the "Pink Book") outlines the judging of a model, it is not always helpful in the nitty gritty of assigning points. The official NAR judging guide predates some rule changes and is sometimes confusing. This article is an aid to those who may face the daunting task of judging Sport Scale (including Giant and Peanut Scale classes), the most common craftsmanship event.

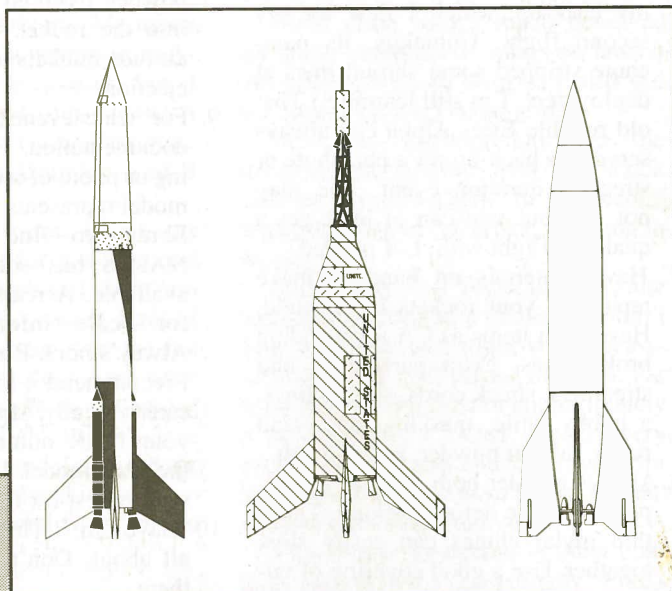
My suggestions for assigning points are opinions. Your only obligation is to follow the Pink Book. I suggest that contest directors give this article to judges at their meets, and pass out copies of the short judging form at the end of this article to each contestant. The modeler can fill out the name, NAR number, division, and prototype name, and hand the sheet in with his or her model.

Qualification

Before you start judging, be sure the models are qualified for Sport Scale. Many unqualified models can be fixed, re-documented, or, as a last resort, replaced. The competitors—your fellow modelers—will appreciate your efforts to help them get their models up to code before judging.

First check for an NAR number, team number, or name on each model. Hiding places include launch lugs, the backs of engine mounts, and fin trailing edges.

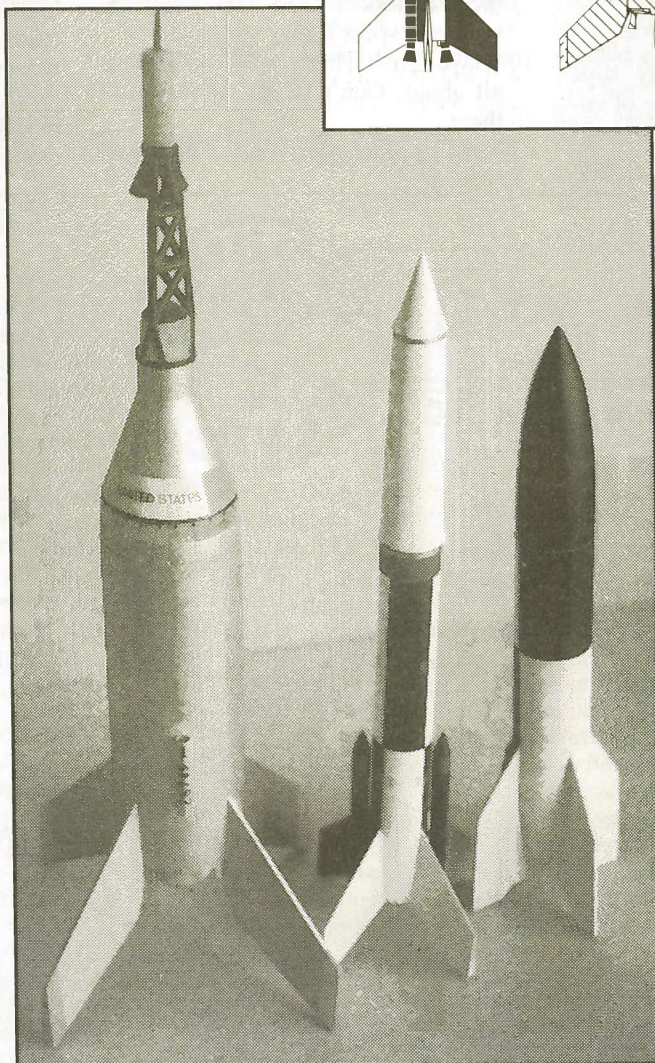
Check for minimum data (drawings or photos). This must include either a photo-



Prototype profiles of Astrobee 1500, Little Joe I, and V-2.

Two of the three models conform well to the profiles, losing just a few points, but the V-2's fins and nose cone are off.

(Adapted from *Rockets of the World*, by Peter Alway, © 1995, Saturn Press)



A mock contest among three of the author's models: In a photo, at first glance, the complexity of the Little Joe I at left seems to win out, followed by the Astrobee 1500 at center and the V-2 at right. In person, however, it is immediately obvious that the craftsmanship of the Astrobee is far superior.

graph or a line drawing that shows the profile of the prototype (the prototype is the original, full-scale "real" rocket that the model represents). Model diagrams from kit instructions and photos of models are not sufficient. You must judge the model against the prototype, not against a kit. If the modeler didn't provide prototype data, ask around—other modelers may have a reference handy.

You will judge the model against the contestant's data only, not against what you or others may know about the prototype. If a modeler's legitimate source has an error, still judge against this source—don't penalize the modeler's for a publication's mistake. And don't reward a modeler for disagreements with his or her data.

The most common "illegal" models are those missing first (booster) stages. Unfortunately, manufacturers have produced kits of the Wac Corporal, IRIS, Aerobee-Hi, Aerobee 300, Aerobee 350, and Black Brant X without their first stages since the beginning of model rocketry. In spite of kit packaging, none of these subjects is a complete, qualified, model without a booster stage—the modeler must substitute a qualified model or slap together a booster before judging. Air-launched missiles need not include the "mother" aircraft.

A Sport Scale prototype must be a rocket, missile, or space vehicle. Jet aircraft are not allowed. Amateur rockets are not allowed, unless they are of "obvious historical importance," such as the projects of the pre-WWII rocket societies. Citations from non-hobby books and magazines can establish the "obvious historical importance" of amateur efforts.

Conversions of plastic static model kits are not allowed in Sport Scale, but all-plastic rocket kits that were meant to fly are not considered conversions. Parts from plastic kits are allowed, pro-

vided the modeler informs the judge.

Peanut and Giant Scale are special classes of Sport scale. Peanut Scale models must be small—either A) no more than 20 mm in diameter, or B) no more than 30 cm tall.

Giant scale models must be big—either A) at least 100 mm in diameter, B) at least 100 cm tall, C) consist of clustered tubes with a girth of at least 314 mm (the circumference of a 100 mm tube), or D) be a winged rocket whose span and length add up to at least 100 cm.

Some kits include dummy display nozzles that are removed for flight. Others have clear fins that are added for flight. The model must be judged with its exterior as it will appear at launch. Recovery systems and engines need not be installed.

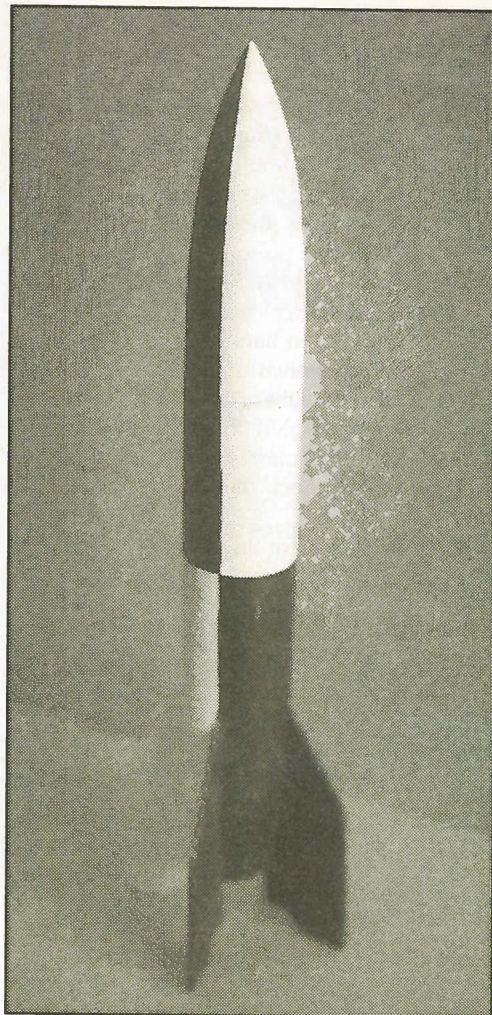
Putting Things in Order

Before you even start judging you will find that the ranking of some of the models is obvious. Go ahead and line up models according to first impressions. Just be ready to change the order as the rules and closer looks indicate.

Judge models one category (similarity of outline, finish color, and markings, etc.) at a time, rather than one model at a time. Start with the best model; this will help you judge to a high standard. Double-check the standings in each category and adjust points if necessary to be sure they seem fair to you.

Finally, don't be afraid to knock off points for problems you might modestly believe you might have had with your own models. Judge against perfection. No model should get all 800 static points (models that good are saved for the World Championships!), and some should be around 400 or lower. Two models within 50 points should be of similar quality, a spread under 10 points is as good as a tie, once the element of chance in flying comes into play.

If you are concerned that a score under 50% is discouraging for young modelers, don't try to concoct another judging standard. Just run off a set of A



This V-2 suffers in Similarity of Outline. The nose cone is sort of an ogive of about the right length, but it doesn't really match the V-2 shape. It gets just 20 of 60 nose outline points. The fins aren't quite right either, earning just 45 of 60 points.

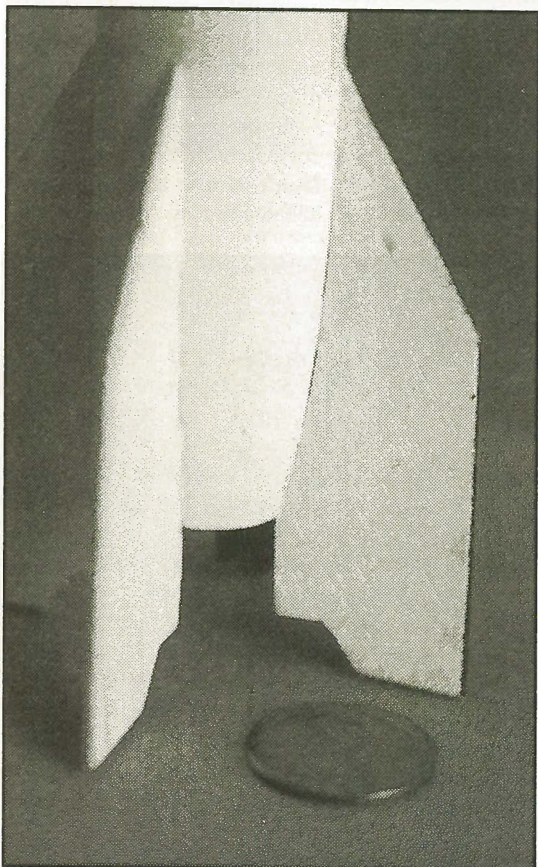
The author couldn't verify the paint scheme (he got it from some old kit instructions) and lost all 200 finish color, and outline points.

and B division judging forms with the possible scores whited-out; 300 points is more encouraging than 300 out of 800 possible points.

Similarity of Outline (200 Points)

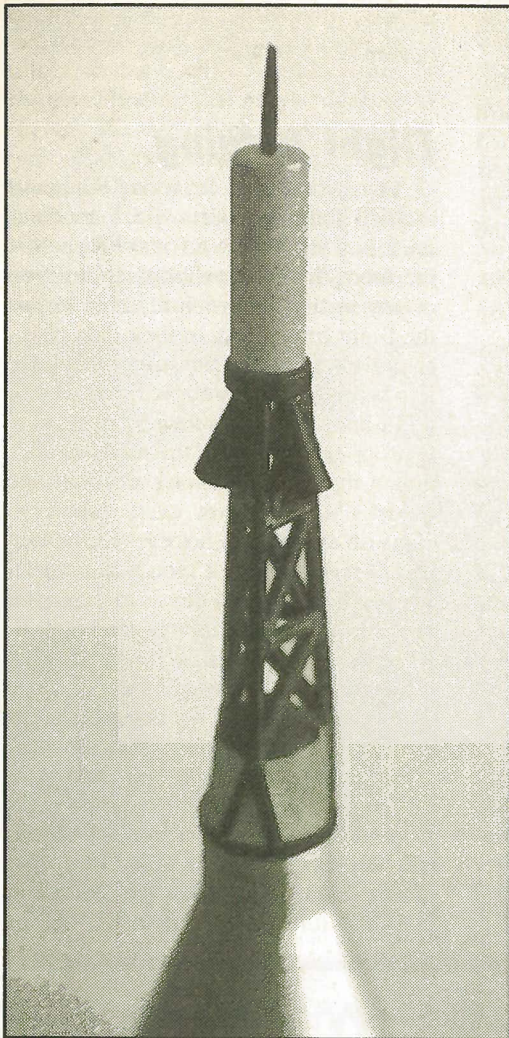
Judge the accuracy of a model's shape from a distance of at least 1 meter (40"). For a reference, scan the contestant's data for a nice simple photo or drawing that shows the rocket's profile.

I mentally divide the points among major components. For instance, a simple 4-fins and-a-nose-cone-model would be about 70 points nose cone, 60 points body tube, and 70 points fins. The Javelin, with 3 visible stages, might



The wood grain of the V-2 fins has been given only minimal sealing. The model earned just 60 of 100 surface prep points in craftsmanship—it could have done worse, but the rest of the model looked better.

The gaps at the fin roots brought construction down to 75 of 100.



The Little Joe wins big on degree of difficulty. I count 29 parts in this escape tower, and a few dozen masked edges elsewhere. It got a full 60 of 60 points for detail and painting, and I couldn't help tacking on another 10 for basic structure for the tower as a whole.

Degree of Difficulty (100 Points)

First look over any difficulty notes the modeler may have provided. Judge difficulty up close. Apply 40 points to basic structure. Give zero points for a simple four-fins-and-a-nose-cone model (IQSY Tomahawk), 20 for a 2-stage, 2-diameter prototype (Nike-Tomahawk), 30 for a complex 3-stage model (Javelin, Saturn V), 40 for a multi-diameter complex model (Saturn IB, Ariane 44L).

Use the remaining 60 to judge complexity of details and painting. You might add a point for every detail part, masked paint edge, decal, and individually applied letter. Give more complicated parts an extra point. Or just line up the models from plain to detailed and pick numbers that seem sensible.

Craftsmanship (300 Points)

Inspect the models close up for quality of construction, surface preparation, and finish. If a model has been damaged in previous flights, consider repairs (or lack of repairs) part of craftsmanship.

Divide the 300 craftsmanship points equally among three fundamental categories. Within each category, allot points to components as seems reasonable. Give full points only for perfection. If you can see a flaw in craftsmanship from a safe launch distance, give zero points for that category for that component.

Allot 100 points for quality of construction. Are parts cut straight, cleanly and uniformly? Are they glued on straight, cleanly and uniformly? Do parts fit? Are the fins perpendicular to the body tube? Check body tube cuts, roundness of turned parts and rolled paper parts. Do body wraps conform to the body tube? Are there gaps between parts? Are paper parts wrinkled?

Allot 100 points for surface preparation. Perfection here means that you can't tell what the model was made of just by looking. Judge results, not effort. Are all balsa surfaces sanded and sealed? Paint on bare balsa gets zero points for that piece. If a bit of grain shows through, give an intermediate score.

Are body spirals filled? Also check for seams on plastic components and paper wraps. Check for any mar or lump that has been painted over. If flaws on a part's surface preparation show from a distance because of a metallic finish, you might deduct all the points for a component, if they hardly show, just deduct a few.

Allot 100 to quality of finish, including paint coverage, masking, and decals. Spread these points among the categories as seems sensible. Is the paint coverage uniform and opaque? Are there visible droplets of spray in the paint surface ("orange peel"), brush marks, or wrinkles?

Masking flaws can be the most obvious flaws on a model. Look for uneven edges due to overspray, paint bleeding under masking tape, or hand brushing. If borders between colors are consistently uneven so that they are plainly

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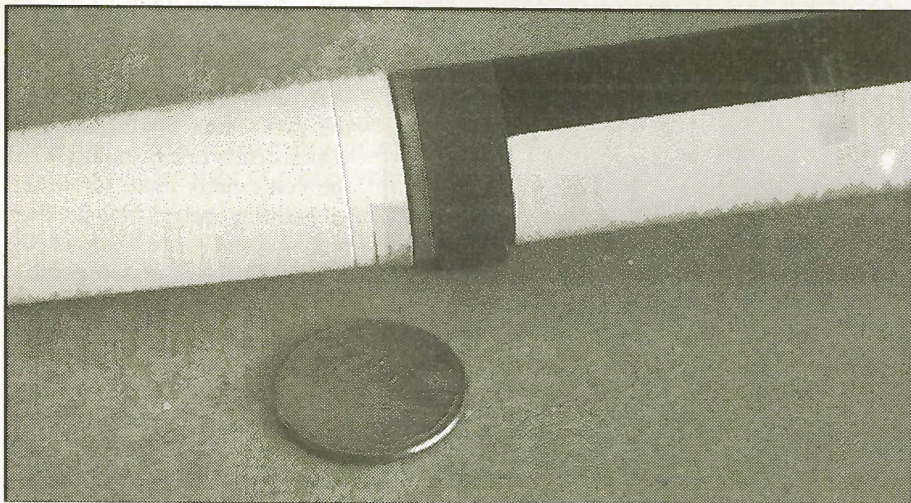
representative of prototype flight: Suggestions for some common missions: 2-stage, 50; 3-stage, 100; 2-engine cluster, 25; each additional engine, 20; deploying components, 10 each, glide recovery, 50; scale spin on ascent: 10; simulated vapor release at ejection: 10; working payload (transmitter, camera, or smoke generator in nose): 25-50; payload returning data to judge (e.g. transmitted temperature,

developed aerial photo, wind speeds calculated from video of smoke trail), 50-100; radio control should be judged by effect, not the mere presence of a receiver aboard the model. You can probably equate the difficulty of other effects with one of the above. A simple gimmick that any rocket could perform with a quick field modification (such as special selection of parachutes) may be worth 5 or 10 points. The maximum

score of 200 points requires a complex flight with multiple effects. If the mission doesn't happen, there are no mission points

Before flight, walk to an ideal observing position, with the sun at your back, close enough to see a cluster ignition, or distant enough to see staging. Divide general flight into 50 points for the flight itself, and 50 points for damage. Deduct 5 points per misfire. Note deviations from a perfect, beautiful flight. Deduct 5 points for launch tipoff or slightly wadded parachute, or other minor bugs; 25 points for marginal stability, non-deployment of parachute, or loss of parts on boost, or other serious flight problems. Deduct all 50 points for a flight so bad that there is serious doubt that it should be qualified (disqualified flights are the range safety officer's call).

Finally, the modeler must return the model to you to assess damage points. Deduct 5 points for a broken fin, dented nosed cone (shock cord snap-back), paint bubble from ejection heat, or other minor problem; up to 50 for all damage. If the modeler opts (in advance) to catch the model, deduct all 50 points.



The Astrobee 1500's main construction problem is in the little fairings, which lose 5 points for being a bit ruffled. The texture along the masked edges costs 5 points on this model, though the same defect might go unnoticed on a larger model. The model loses 10 points for wood grain that is visible on the nose under harsher lighting.

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Static Score	Static Score	Static Score
Score 125/10	185/1200	160/1200
Score 140/10	180/1200	0/1200
Score 90/10	70/1200	20/1200
Score 275/1200	200/1300	185/1300
Static Score 705/10	Score 635/1800	Static Score 365/1800
Prototype flight Mount: 10. Spin: 10.	flight 2. Spin: 10.	Prototype flight 10. Spin: 10.
Flight 2/1200	2/1200	2/1200

The results of the hypothetical match of three of the author's models. The first-place Astrobee won on accuracy and craftsmanship (this model took a trophy at NARAM once). The Little Joe took second, gaining little advantage from its complexity, and losing a lot to poor surface preparation. The V-2 lost most of its points with its undocumented paint scheme.

Final Results

Add the flight points (if the modeler flies twice, use the score from the best flight) to the static points for the final standings. Check your math, and hand the judging forms to the contest director.

Most modelers will accept your judgments graciously, but a few may grumble (usually the parents of A-division modelers). A simple explanation of where the scores come from (and how the pink book allots points to various categories) should leave the contestants more interested in building better models than lynching the judge. By working to prevent disqualifications early in the event, and by confirming to yourself that each category of scores is reasonable, you make Sport Scale a friendly learning experience for modelers and judges alike. And remember, if you bring a Sport Scale model next time, you won't have to judge!

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SPORT SCALE JUDGING FORM

Modeler Name: _____

NAR #: _____ Contest division: A B C Team: _____

Prototype: _____

Qualification checklist

- NAR number, team number, or name on model.
- Minimum documentation: prototype drawing or photo
- Resembles a complete rocket, missile or space vehicle in a configuration that flew (no missing lower stages unless vehicle flew without). Amateur rockets must be of obvious historical importance.
- If Peanut Scale, no more than 30 cm long or no more than 2 cm in diameter.
- If Giant Scale, at least 100 cm long or at least 10 cm in diameter, or girth measured around significant outer assemblies is at least 31.4 cm, or wing span plus length at least 100 cm.
- Exterior of model must be flight-ready (dummy nozzles removed and transparent fins installed, etc.).

Modeler cannot receive points until above requirements are met.

Static Qualified: _____

Similarity of Outline

Accuracy of shape judged from 1 meter (40"), checked against data provided by modeler.

Nose: ___/___ Fins: ___/___ Tubes: ___/___ Transitions: ___/___

Major details: ___/___ Other: ___/___

Similarity of Outline Score: ___/200

Finish, Color, and Markings

Accuracy judged from 1 meter (40"), checked against data provided by modeler. (if no color data, score is zero).

Correct colors ___/___ Accurate pattern ___/___ Decals & markings ___/___

Finish, Color, and Markings: ___/200

Degree of Difficulty

Judged up close, referring to modeler-provided notes.

Complexity of basic structure: ___/40 Complexity of detail and painting ___/60

Degree of Difficulty: ___/100

Craftsmanship

Craftsmanship judged up close. Construction ___/100 Surface prep ___/100 Finish ___/100.

Craftsmanship Score: ___/300

Static Score

Total Similarity of Outline; Finish, Color, and Markings; Difficulty; and Craftsmanship Scores.

Total Static Score: ___/800

Mission

Start from zero. Add points for successful in-flight functions if documented as representative of prototype flight
2-stage: 50. 3-stage: 100. 2-cluster: 25. Additional cluster: 20 per engine. Glide: 50. Deployment: 10.
Spin: 10. Release: 10. Working payload: 25-50. Payload producing reduced data for judge: 50-100

Mission Score: Flight 1 ___/200 **Flight 2** ___/200

General Flight

Deduct points for flight problems.

#1: Flight ___/50, Damage ___/50 #2: Flight ___/50, Damage ___/50

General Flight Score: Flight 1 ___/100 **Flight 2** ___/100

Flight Score

Add Mission Score to General Flight Score.

Total Flight Score: Flight 1 ___/300 **Flight 2** ___/300

Final Score

Add Total Static Score to better of two Total Flight Scores.

Final Sport Scale Score ___/1100