



INSERT EVENT LOGO, NAME AND DATE

TCC Sport Scale Judging Form: Sport

Contestant Information

Name: _____
NAR Number _____ Division _____ / _____ Section: _____
Prototype: _____
(Include scale, if known.)

Note: Sport Scale is judged under two main rules: 16 & 53. Judges should also be familiar with Rules 1 – 13.

Qualification Checklist (Entry may not receive points unless all requirements are met.)

- ☐ NAR number, team number, or name on model. (Rule 9.4)
- ☐ Exterior is in flight-ready condition: i.e. dummy nozzles, transparent fins, etc. (Rule 16.5)
- ☐ Resembles a complete, actual rocket, missile or space vehicle that was built. (Rules 53.1, 53.4, 53.7)
- ☐ Meets class size criteria. (Rules 53.2.1, 53.2.2, 53.2.3)
- ☐ Not an amateur rocket or missile unless historically significant. (Rule 53.3)
- ☐ Entry is not a Plastic Model Conversion under Rule 55. (Rule 53.5)
- ☐ Minimum documentation such as a line drawing or photo (Rules 53.6, 53.12.1)

Static Judging – Don't exceed max total scores. Other numbers are suggestions only. Record points awarded.

Similarity of Outline – Judged from a distance of 40 in (1 meter) against data provided by the contestant.

Rules:	53.1, 53.9, 53.12.1	Max total score:	200/200
Nose:	/	Fins:	/
Major details:	/	Other:	/
		Total Similarity:	/200

Finish, Color and Markings – Judged up close, referring to data and notes provided by the contestant.

Rules:	53.12.2	Max total score	200/200
Correct color:	/	Accurate pattern	/
		Decals & markings:	/
		Total Finish, Color & Markings:	/200

Degree of Difficulty – Judged up close. Plastic parts from kits must be declared in the documentation.

Rules:	53.5, 53.9, 53.12.3	Max total score	100/100
Structure:	/40	Detail and painting:	/60
		Total Difficulty:	/100

Craftsmanship – Judged up close. Includes NAR number and transparent fins.

Rules:	53.12.4	Max total score:	300/300
Construction	/100		
Surface preparation:	/100	Finish:	/100
		Total Craftsmanship:	/300

Total Static Score – Add the above static judging subcategory totals (shaded areas): **/800**

Flight Characteristics: Don't exceed max/total scores. Other numbers are suggestions only. Record points awarded.

Mission – Start from 0. Add points for successful simulated mission function documented for this prototype.

Rules:	53.13.1	Max total score:	200/200
Spin, deployment, release:	10, 2 engine cluster:	25 (3=45,	
4=65), Glide, 2 stage, working payload:	50, Payload		
producing reduced data for the judges to review:	50 – 100	Total Mission #1:	/200
		Total Mission #2:	/200

General Flight – Start from 300. Deduct points for problems. Flight must be safe and stable to qualify.

Rules:	16.6, 16.7, 16.8, 53.11, 53.13.2	Max total score:	100/100
#1 Flight:	/50	#1 Damage:	/50
#2 Flight:	/50	#2 Damage:	/50
		Total General flight #1	/100
		Total General flight #2	/100

Flight Score – Add Mission score to General Flight score for each official flight (shaded areas).

Total Flight Score #1	/300
Total Flight Score #2	/300

Final Score Add Total Static Score to best Total Flight Score. **/1100**

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Date: _____

Judge's Name & NAR #: _____ Judge's Signature: _____

Using the TCC SPSC Judging Form

Note 1: For details on judging and scoring this event, see the comments by Peter Alway and John Pursley that follow this section.

Note 2: Insert your section logo, contest name and date at the top of the form.

Contestant Information:

Fill in the contestant's name and NAR number as shown on their USMRSC Sporting License. Enter their actual competition division (based on their age) to the LEFT of the slash in the Division box. If the Contest Director combines competition divisions, enter the combined divisions to the RIGHT of the slash in the Division box. Record their section number/IND/Non-NAR as appropriate. Fill in the prototype's name and the substantiation type (ie, line drawing, color photo, blueprint, photos, actual measurement, etc.). Give the scale if the contestant has provided it.

Qualification Checklist:

Each check box lists the rule that requires this item. Check off each item if the entry meets the requirement of the rule. The entry is NOT a qualified SPSC entry if ANY box is unchecked.

Static Judging:

Static Judging has four scoring sections:

1. Similarity of Outline
2. Fins, Color and Markings
3. Degree of Difficulty
4. Craftsmanship.

Each scoring section on the TCC SPSC Judging Form starts with a one line statement regarding judging the section followed by the rule numbers that apply to that section. The form has a blank for each element that you can score. Each blank is divided by a slash. Enter the number of points you award for each element to the left of the slash. Enter the number of possible points to the right of the slash. Some blanks have a suggested maximum already entered to the right of the slash.

For example (based on Peter Alway's comments):

The maximum score for **Similarity of Outline** is 200 points out of a possible 200 points. This is shown on the form as 200 / 200. That is, the score the entry received followed by a slash and the maximum possible points.

There are four major components you will probably need to score for any entry:

1. Nose
2. Fins
3. Tubes
4. Major Details.

There is a blank for Other that you can use if you need to. Mentally divide the points among the 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. If you award full points for the nose cone, the score will be 70 / 70. If you award half of the possible points for the body tubes, the score will be 30 / 60. In any case, you can only award a maximum total of 200 points for Similarity of Outline.

Some of the blanks show suggested maximum scores. One example is Craftsmanship. This element of judging can be broken down into three major components:

1. Construction
2. Surface preparation
3. Finish

Each should probably have an equal number of points. Since the maximum total score for Craftsmanship is 300, each major component already shows 100 as the maximum score for that component. This is only a suggestion. You can cross it out and write your own maximum.

Flight Characteristics:

Flight Characteristics Judging is conducted in the same manner as Static Judging. There are two components, Mission and General Flight.

Mission: 200 points maximum. See Peter Alway's comments below on awarding mission points.

General Flight: 100 points Maximum. This should probably be broken down equally into two major components: Flight and Damage. Since a contestant can make up to two official flights (USMRSC 10.1), you may have two flight and damage scores - #1 Flight and #1 Damage, #2 Flight and #2 Damage. Start at a maximum (say 50 each) then deduct points from that maximum for flight/recovery problems (USMRSC 53.13.2) and damage the model sustains during flight and/or landing.

Flight: Deduct points for problems during launch and flight, misfires, minor stability problems, minor recovery problems, and any other flight problems that do not cause disqualification. For example: 5 points for each misfire, 20 points for marginal stability, 20 points for partial parachute deployment.

Damage: Deduct points for damage the entry sustains during flight or upon landing. For example, 5 points for a broken fin, 5 points for parts that fall off, 20 points for damage that would not require repair for the model to fly again, 50 points for damage that would require repair before the entry could be safely flown again.

Human Intervention: USMRSC 16.7 allows the contestant to elect to catch his model and provides for "accidental and/or inadvertent" human intervention. If the contestant elects to catch the model, enter zero points in #1 Damage or #2 Damage as appropriate. If the RSO rules that the human intervention is "accidental and/or inadvertent" and the contestant elects to accept the flight as an official flight, enter zero points in #1 Damage or #2 Damage as appropriate.

Lost Models: USMRSC 16.8 states that if a model cannot be returned to the judges, it will be considered as having sustained "maximum damage". Enter zero in #1 Damage or #2 Damage as appropriate.

Final Score:

The Static Judging Score will not change as a result of flying. However, since each contestant can make up to two attempts to achieve a qualified flight, the form has blanks for these possible flight scores. If the contestant makes two flight attempts, add the Flight and Damage points for flight one to get the Total General points for flight #1. Add the Flight and Damage points for flight two to get the Total General points for flight #2. Add the Total Mission points for flight one to the Total General points for flight one to get the Total Flight Score for flight #1. Do the same for flight two. Pick the highest Total Flight Score and add it to the Total Static Score to determine the Final Score.

Finishing the Paperwork:

Enter the date in the Date field, print your name and NAR number in the Judge's Name field and sign the form in the Judge's Signature field.

Judging NAR Sport Scale

by Peter Alway NAR 26985 SR

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 photograph 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 kits that were meant to fly are not considered conversions. Parts from plastic kits are allowed, provided 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% discouraging for young modelers, don't try to concoct another judging standard. Just run off a set of A 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 have 25 points for each of 3 fin sets, 15 for each of 4 tubes, 15 for each of 3 adapters, and 20 for the nose cone. Knock off all points for a component if it is simply the wrong part--say a conical nose that should be an ogive. Give full points if you can't spot any difference between the shape of the model part and the prototype part. You are only allowed to judge accuracy by eye (no measuring), with profile drawing or photo in hand. Look out for nose, body, and transition lengths, relative diameters of tubes, fin shapes, and correct fin location. If there are major details like antennas, conduits, and rocket nozzles, check their size, shape, and location. Deduct points for added non-scale fins that are not transparent. Don't worry about construction quality. Stand back and look at the overall effect, too. Does the shape look right?

Finish, Color, and Markings (200 Points)

Judge the accuracy of the model's color scheme. Find the modeler's color data (color-keyed drawings or color photos) for this section. If there is no color scheme data, give a zero for this section, but don't disqualify the model. If color data is in the form of a B&W photo only, with no color descriptions, assume colors are wrong, but give appropriate points for patterns and markings. I mentally divide the 200 points among correctness of colors, accuracy of paint patterns, and decals, say, 60-70-70. If a model has multiple paint colors but no decals, I might split them 100-100-0. For a model with one color of paint with decals, it might be 50-0-150. See that all colors are the colors they should be, splitting color points among the different paint colors on the model. Give zero for plain wrong (silver vs. brown) colors, and partial points for mismatches. Next look for paint pattern. Are the painted areas and their edges in the correct places? Finally see that decals are correct and correctly placed. Don't worry about neatness of the painting and decals yet.

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 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 visible from a safe launch distance, deduct 50 points for masking. Are decals straight? Check decals for visible film. This usually takes the form of "silvering" when decals are applied over a dark matte-finish paint. Honest John kits are notorious for this problem. Is there glue from repairs over the paint?

Check Your Work

Add up the static points and review your results. Line up the models in order of their total static points. Is the ordering justified, or did you make a mistake?

Before returning the models to the contestants, be sure someone takes group photos of the scale models for the local newsletter (and for Sport Rocketry). Give the modelers a chance to admire each other's work.

Flight Judging

You will need at least one clipboard to hold judging sheets. Each modeler must find you before he or she flies. It is the modeler's responsibility to tell you of any in-flight mission features before the flight (preferably in their data packet as well as on the field), but it is wise to prompt them before the flight. If you don't know for a fact that the mission is appropriate, insist that the modeler document that the prototype performed the model's mission. Not every prototype spins on ascent and not every sounding rocket released vapor clouds at apogee.

The following guidelines for mission will allow a fair balance of model quality and flight effects. A single mission effect can change the contest standings among good models, but if you did your job in static judging, a poor model with one flight effect will not beat an excellent model. Start from zero for a model that lifts off, deploys a parachute or two, and comes down. Add points for successful in-flight functions if documented as 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 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 tip-off 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.

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!

Mission Points

by Peter Alway NAR 26985 SR

I wrote the guidelines on the principle that the most complex mission I could think of would max them out. So I think an Ariane 4 with 3 stages, 4 strap-ons, and a 4-cluster first stage would reach the 200 mark.

Start from zero for a model that lifts off, deploys a parachute or two, and comes down. Add points for successful in-flight functions if documented as 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

Let's see--100 points for 3-stage, 65 for core cluster. Strap-ons get 30 each, for 120 points, adding up to over 200

Space shuttle: 2 SRB's plus 3 main engines--85 points, plus glide recovery--50 points, plus SRB and tank sep--30 points, R/C roll program on ascent--10 points, RC heading alignment circle to pre-determined runway--10 points, RC flare maneuver, 10 points, R/C landing gear deploy--10 points.

I'm figuring each R/C event is worth as much as spin on ascent.

Winning Sport Scale by the Rules by John Pursley NAR #27845

Bear in mind as you read and consider what I have to say is that every scale judge is an individual and it is up to him to interpret the rules when it gets right down to the nitty gritty. What I am saying is not set in stone and certainly there are some out there who will disagree with me. However, use what you read here as a basis for formulating questions that you might ask of the judges at the next scale meet you attend.

The Very First Rule...and Playing the Grey Area

I think there are more discussions and arguments about the very first paragraph of the NAR Sport Scale rules than just about any other in Scale rocketry.

53.1 Scope

Sport Scale Competition comprises three events open to any model rocket that closely resembles an existing or historical guided missile, rocket vehicle, or space vehicle. The purpose of this competition is to produce a flying replica of a real rocket vehicle that exhibits maximum craftsmanship in construction, finish, and flight performance. Sport Scale Competition differs from Scale Competition (Rule 50) in that the dimensions of the model are not directly measured.

In a nutshell, this rule basically tries to say what a Sport Scale model is. Due to its intentional brevity, it leaves a lot of room for interpretation. But let's look at the letter of the rule.

The second sentence of the first paragraph is the most defining element of Sport Scale competition (perhaps a minor Pink Book revision should reverse the order of first and second sentences of this paragraph) "...To produce a flying replica of a **real rocket vehicle**..." I think the spirit of the rule is clear in that the intention is that you produce a model of a vehicle which uses as its source of power a form of rocket power. It doesn't exclude other forms of power from being included...but it does more or less require that some element of propulsion be powered by a rocket...very simply a reaction device that carries all of its own fuel and moves by ejecting something (likely, the by-products of burned fuel) at high velocity in order to derive motive force. You can bend and nit-pick over definitions all you want, but if some element of propulsion is not that of the rocket, then you just don't fit the requirements of the event.

The first sentence defines the model as a MODEL ROCKET. It states that it should closely resemble an existing or historical guided missile, rocket vehicle, or space vehicle. This is the part that most argument, open interpretation, and disagreement in the event centers on. 'Nuf said on that one.

Some will want to argue what the word "resembles" really means in the context of the rule. Well, that's kind of like trying to define what the meaning of the word "is" is. But, it is what the heart of the event is about. The more closely and accurately you come to building a model that is identical to (but it can be smaller [usually], the same size [infrequently], or larger [almost never] than) the real thing. I won't dwell further on this.

However, the next few words: "...existing or historical guided missile, rocket vehicle, or space vehicle" are the real crux of most arguments. Just what is a guided missile, a rocket vehicle, or a space vehicle? The rule, due to the use of the word "or" in the sentences does not mean that your prototype choice has to fit all of these three categories. It simply means that it should fit at least one of them. Many modelers feel that all three automatically imply that the prototype must be some kind of rocket. If you go by the letter of the rule, only one of the three says anything about "rocket."

Guided Missiles have had solid rockets, liquid rockets, turbojets, and ramjets for power. There have been missiles which use combinations of rockets and jets. Some will argue the rockets are okay but nix the jets. This is not what the rules say. Further...guided missiles have also utilized internal combustion piston engines and propellers, turbojet engines, and even no engines (in the case of gliding missiles). The first recognized guided missile was a rail-launched, piston-powered biplane in World War I. And there have

been missiles which are piston powered but are launched by rockets. Just don't try to convince a Scale judge that your replica of that very first biplane that it qualifies (You figure it out...it didn't have a rocket motor).

Perhaps the one controversial element here is the word "guided." I don't think that the intent is to exclude unguided missiles and rockets but the term "guided missile" is so common that we can just call this a case of being too "generic." It's just like calling any cola soft drink a "coke" (lower case usage is intentional!). Perhaps the rule should more accurately read "missile or guided missile."

Rocket Vehicle is the vaguest of the bunch in spite of at first seeming the most obvious. Is the little known liquid rocket powered P-51 a "rocket vehicle"? I'd say so (more because it could and did fly solely under the power of its liquid rocket motor). Is a rocket boosted glide bomb a rocket vehicle? I'd say so. What about the NF-104? Most certainly so. And...here's a stretch...what about a RATO assisted C-130 Hercules cargo plane? Hmmm.... BIG, BIG Stretch coming here...what about the NASA SR-71 which was to have also fired (and got supplemental thrust as a result) a linear aerospike engine strapped to its back?* There are many more examples.

Space Vehicle really leaves the door open. There are space vehicles which have no propulsion at all (but remember that the second sentence clearly states "real rocket vehicle") so don't try to get by with a Skylab (it had no rockets or maneuvering thrusters but was "maneuvered" by using a series of massive spinning gyro stabilizers.. What about vehicles like the Lunar Module?** I'd say it fits (It also fits the "rocket vehicle" part, but then again, it can be argued that it cannot fly and perform its mission without being launched on top of and might technically be considered a "stage" of the Saturn V...which is the point of yet another Sport Scale rule). What about the Apollo Spacecraft? It does have rocket power and thrusters. It is an autonomous vehicle. But to the mind's-eye of some it suffers the same "is it a 'stage' of the Saturn?" problem. Now, the BIG stretch...what about the Shuttle Orbiter? Is it a space vehicle or a stage? Hmmm...

*There's really a sneaky "gotcha" on the SR-71 issue. Though the SR-71 was fitted with and flew with a linear aerospike engine on its back, it never "fired" the engine due to technical issues.

**Precedence is in favor of the Lunar Module as it has been allowed to enter and has placed well in several competitions, including NARAM. By extension of this precedence, space vehicles (particularly if they have a primary rocket propulsion system) should also qualify...Surveyor, Apollo SM/CM, Viking, etc.

Bottom Line

Most modelers, particularly those that want to have some assurance of not being disqualified or having their model "discounted" or "minimized" in the mind's eye of the judge, will play it safe and select prototypes that are obviously rockets in the classic sense in that they tend to be relatively long and slender, usually with fins, and powered by either liquid or solid rockets. You are also safe in extending this to pure rocket aircraft such as the X-1, X-2, X-15 and the like. How far you push it is up to you but be prepared to suffer the "judgment" of the person who is judging your event.

My suggestion is that if you are new or relatively new to Sport Scale, stick with something that is very obviously a "rocket." This is pretty much a common sense thing. They are generally easier to model successfully and to rake in a high number of points. If you want to push the limits and get into "grey areas" of the definitions of what is allowed in the Sport Scale rules then you will probably have other things to consider in addition to trying to convince the judge that your borderline choice fits the rules because chances are that it will also be of a relatively non-rocket shape that is not easily adapted for flight, have asymmetries and compound curves that are hard to model, and push the limits for reliable and safe flight. The question you have to ask yourself is "Is it worth it?" By selecting borderline prototypes you are probably lowering the number of points that you can get due to falling short in Similarity of Outline (the most important rule), Finish, Color and Markings (which are usually complex and hard to do well in borderline prototype choices), Craftsmanship (more complex shapes and number of components works against you here), Mission (you'd probably just skip and not go for those points), and General Flight (yeah...just TRY to get that asymmetric, forward CG creation to fly straight...).

And remember, when it comes to judging, Scale judges have almost as much “say” over your model during static judging as an RSO has on the flying range. He won’t take favorably to having his valuable judging time (and he has probably spent HOURS looking at models with more to come) arguing with you whether or not your model fits the Pink Book definition.

Winning Sport Scale By The Rules by John Pursley NAR #27845

Having judged NAR Sport Scale since its inception (and NAR Scale in the years before and since) I have discovered that one of the biggest weaknesses in a modelers' strategy is that they concentrate so much on the model itself that they tend to ignore the importance of the rules. Understanding the rules is the key to winning Sport Scale. You can build the best model in the world but if it doesn't take advantage of and comply fully with the rules you will have an "also ran" entry that doesn't place as high as it could if you had just made a few simple changes.

The Most Important Rule!

As a judge, I have found the most important, yet most ignored rule has to do with Rule 53.12.1 which is Similarity of Outline. This one rule is the focus of the competition yet most modelers fail to understand and fully comprehend how important this rule is as well as how to take advantage of it. Following is the full text as it appears in the NAR Pink Book.

53.12.1 Similarity of Outline: 200 points.

The contestant is required to submit data to substantiate his/her model's visual resemblance to the prototype. Minimum allowable data consists of:

- (a) A line, tone, or color drawing; or
- (b) One or more clear photographs, halftones, or photo-reproductions of the prototype, sufficient to show the outline and general configuration of the prototype modeled.

Any entry not accompanied by the minimum allowable data as listed above shall be disqualified. The Judges may disqualify any entry which, in their opinion, is accompanied by substantiation data of such poor quality as to fail to convey a satisfactory impression of the outline and general configuration of the prototype.

Upon a casual reading, its meaning may seem obvious. However, there are subtleties buried within and "between the lines" that are crucial in improving your chances of a winning entry.

First, you must remember that the judge goes ONLY (or he should!) by the data that you include in your data pack. He may be the most knowledgeable expert in the hobby on your particular prototype but you should always make the assumption that the judge knows absolutely nothing about the vehicle you are modeling and therefore supply adequate data for him to fully visualize from the data you provide exactly what the real thing looks like. Conversely, also assume the judge just MAY be very informed of the prototype you are modeling and therefore you should not provide irrelevant, misleading, inapplicable, or "bogus" data. Doing such won't do your entry any good and could well taint your reputation and trust for future competition.

A very common mistake is to simply photocopy a photo and this is your "data." Since you have built the model, your brain makes the "connection" between the original clear photo and the model you have build and you then begin to view the photocopy as the equivalent to the photo when in fact the photocopy conveys no accurate color information, the true outline of the vehicle is often unclear or obscured by other objects in the picture, or the exaggerated contrast of the copying process obliterates or makes the true nature of the photo impossible or difficult to comprehend. To help avoid this pitfall, you should always work under the assumption that the judge has never seen a photo, drawing, or model of the prototype that are modeling.

Also keep in mind that Similarity of Outline constitutes almost 20% of the total points available...and realistically, when you consider the points that (depending on just how well you do in Craftsmanship and Mission) at the end of judging it's likely to be more like 30% or more of the total actual score. With this in mind, it is easy to see that it is much easier to get a high score with prototypes of very simple shape than with prototypes of complex shape. It is conceivable and likely (if the judge follows the Pink Book rules

precisely) that a prototype with a very simple shape such as the Japanese Pencil will garner a much higher score than a prototype of much more complex shape such as a Vostok. There are simply more "shapes" on a Vostok to mess up on than a Pencil that will lower your Similarity of Outline score. So, unless you are sure you can precisely model complex prototypes, you are working against yourself by trying to model complex subjects in an effort to "wow" the judge. Don't think that you have a good chance of making up for a loss of points by going for "Degree of Difficulty." You don't...because there are only half as many points available for Degree of Difficulty (100). You do the math on this one.

The first sentence of the final paragraph of the Similarity of Outline rule contains the most powerful wording and intent and bears one of only four threats of disqualifications in the wording of the Sport Scale rules in that you must provide a minimum of printed data in the form of at least one line drawing OR one (or more) CLEAR photographs, etc. If you decided to forego drawings and just go with a photo you are running a great risk in that a judge can potentially disqualify you for photographic data this is not sufficient to adequately determine the outline of the vehicle you are modeling. My recommendation is to go with drawings over photos or, better yet, BOTH drawings and photos.

There is one other important word within this paragraph to which you should pay special attention and be aware of how it can be interpreted and that word is SUBSTANTIATION. The word more than implies that the data itself be accurate and (though it is not specifically stated) should be from an accurate, reliable, or verifiably accurate source. Don't create a drawing based on YOUR interpretation of what the prototype looks like and present that as your data. Don't download a drawing or sketch from the Internet unless that drawing or sketch is verifiably accurate or from an "official" source such as the vehicle manufacturer or user.

Just as important is that any data that you present with your model is actually representative of both your model and the prototype on which your model is based. Don't present data on, say, the last round of the Little Joe II that was flown when your model is representative of the first round. They both are Little Joe vehicles used in the Apollo test programs but they are significantly different. Likewise, make sure the color data represented by the drawing or photo is representative of the color and patterns you have put on your model. Above all, don't "doctor" your data. You may get away with it...but if you get caught, there aren't too many judges that I know who would hesitate to disqualify you on the spot...and believe me, your reputation will suffer right on the spot, too.

One other significant paragraph in the Sport Scale rules actually comes in the paragraphs before those which actually have to do with scoring. Paragraph 53.6 states: "The contestant must supply data to substantiate his/her model's adherence to scale in shape, color, and paint pattern." Note that all of the elements are required and the word "or" is not a part of the paragraph. I think that this should replace the first sentence of the scoring rule (53.12.1) but it is not and leads many modelers to omit one or two of the REQUIRED data elements because most modelers concentrate on reading just those paragraphs that have to do with scoring. Going back to my preference for drawings, it is very easy for a drawing, even one in black-and-white, to contain shape, color, and paint pattern information. Conversely, unless you are providing a good color photograph you are probably only going to get shape and patterns...since photocopies don't convey color (unless, of course, the prototype is exclusively black, white, or some grey shade in between).

One other mistake many modelers make is to use the drawings that the manufacturer of the kit he is using for Sport Scale as substantiation. Though not specifically stated in the Sport Scale rules, drawings included with the kit by the manufacturer of the kit would not be considered "authentic" or satisfy the meaning of "substantiation." An exception might be if the manufacturer included reproductions of drawings from an authentic source (such as from the manufacturer of the real vehicle). Also, it is very common for manufacturers to include photos of their prototype model which show paint pattern or decal placement...these are not photos that can be used to substantiate a model since the photos themselves are of a model. This is the next thing to using the model to substantiate itself...which is not what any of the NAR Scale events are about. Again, an exception might be if the manufacturer included photos of the real prototype.

Considering all of this, it is very easy to see that the quality and useful quantity of the data that you present is just as important as the model itself...something that is often overlooked by the modeler who spends 99.9% of his time on the model and less than the remaining .1% on data with respect to its accuracy, authenticity, and in content of the required minimum elements.

Kits

Don't make the mistake of thinking that because a model is a "kit", even from the most popular of manufacturers, that it is accurate in outline when compared to the real thing. Very frequently manufacturers will make compromises to "scale" kits to make them more reliable and safe (i.e., such as by using larger than scale fins) or out of convenience or pricing (i.e., by using a nosecone from one of their sport kits that is "close"). If your kit model has fins that are too big, build them to the correct size and add more nose weight to compensate. If the nose cone is not right, fabricate your own. You get the idea. Judges are not sympathetic to errors just because they exist in the kit to start with.

Summary

1. Selecting a prototype with a simple shape makes it easier to score more points based on "Similarity of Outline" than complex prototypes.
2. Don't count on making up lost points you loose in Similarity of Outline scoring by gaining points in Degree of Difficulty (only 100) or Flight unless you are exceptionally experienced and plan on successfully pulling off some really killer flight effects.
3. The data you present is MORE important than the model itself...because it is exclusively this data the judges will use in evaluating your model.
4. Don't assume a kit is any better then scratch-building...they often contain compromises that scratch-built models would not have.

Winning Sport Scale by the Rules by John Pursley NAR #27845

Almost without fail, the weakest part of most Sport Scale entries is in the documentation that the modeler turns in with his model. By the rules, the only data that the judge may critique and evaluate the model by is in the information that the modeler provides yet it is complete or even minimally adequate data that is woefully lacking in many entries. We'll have a look at the rules and cover both required and recommended documentation as set out in the Pink Book rules for Sport Scale as well as any supporting data that the modeler might wish to include to improve his chances for a higher score.

Data and Documentation...

It's in the rules more than anything else.

I was fortunate enough to experience Scale model rocket competition before there was such an event as Sport Scale. In NAR Scale competition, even the data pack is scored and it was realized by most that this was an "easy" place to make up points. With Sport Scale, the intentional emphasis was placed on just getting people "into" scale modeling without the burden and overheads that NAR Scale competition involved. Unfortunately, documentation didn't rate a scoring rank when Sport Scale was introduced and people have, unfortunately taken this to mean that data documentation isn't important. This is most certainly a mistaken belief. Even though the data you present is not eligible for points it has an unmistakable influence on the points that you get on your model in a plethora of ways.

Let's look at the way data and its presentation is important to Sport Scale competition as it stands today.

Though there is a brief mention of data in Paragraph 53.5 (Plastic Models and Kits) with respect to documenting the use of parts from kits, the first rule, 53.6 DATA, has a single brief but widely encompassing sentence regarding data.

53.6 Data

The contestant must supply data to substantiate his/her model's adherence to scale in shape, color, and paint pattern.

This sentence stipulates that the "contestant" must provide the data. There is no provision for the judge or anyone else to be familiar with the data or the prototype the modeler has chosen or the model that he has been presented for judging. The implication here is that the data the contestant supplies is the sole source of data that will be used in the judging process.

The word "substantiate" has some deep implications of its own. It generally means "To support with proof or evidence or to establish validity and accuracy." Substantiation can be acceptably provided in NAR competition in a variety of ways. By far, the best data that satisfies substantiation requirements would be printed and photographic information from the manufacturer or user of the prototype. Manufacturer's blueprints and plans are like gold, as are official photographs. Information from other credible sources such as NASA documents, manuals, and the like is also pretty good. A photo of the real thing is good substantiation (provided it is clear and of such composition as to be directly applicable to determining the characteristics of the prototype being modeled). Also, documentation provided in NAR publications such as NARTS data packs and its current and past publications or publications that the NAR has affiliated with such as *The Model Rocketeer*, *Model Rocketry*, *American Spacemodeling*, and *Sport Rocketry* is taken as "official" for the purposes of judging Scale and Sport Scale competition. Also, "credible" sources such as books dealing specifically with or which have sections that deal the subject of the prototype that you are modeling such as encyclopedias, aerospace/military/science trade publications, and commercial publications such as *Rockets of the World*, etc. Recently, there has been a variety of good data in the form of data CDs such as those available from Mike Dorffler and others.

The important thing to remember is that data should be verifiable from other sources. This is not to say that the judges will go out and actually verify the data that you provide but most scale judges are quite knowledgeable about scale data in general and are quite keen on discerning "good" data from not-so-good by its source and nature.

In this day of computing, there are more sources of data than ever available to the modeler. However, the door is also open to bogus “interpreted” data, doctored data, or data that is more fantasy than fact. It is up to the modeler to adequately research the data he wishes to present to assure that it is accurate and truly representative of the prototype he has chosen.

Nothing beats a good multi-view line drawing from a good source. This is what you and the judge will refer to the most with respect to the outline of the model. Color is usually best illustrated by a good color photograph (a picture is worth a thousand words...) and the paint pattern and markings are generally best represented by a combination of photographs and line drawings. Written descriptions of color and paint pattern are also helpful. But beware of “illustrations” that are generated by an artist who is trying to supplement the text of a publication that has to do with your chosen prototype. Very often the only thing the illustrator has to go by is some other illustration or photo and he/she has not real idea of what it is they are really illustrating.

Data is also mentioned in paragraph 53.7 (Stages) with respect to providing data to prove if your prototype was of a generally multi-staged configuration and you are opting to fly a model without one or more of the stages of the normally configured prototype that the data must support the fact that it also flew in the configuration you are modeling. It is rare that multi-staged vehicle upper stages were ever flown without a booster but there is a limited variety of sounding rockets that DID. Conversely, there are rockets that NEVER flew without a booster but have been popularly modeled without one. The WAC Corporal is one such “popular” prototype that never flew without a booster but came be popularly modeled without one because it was available as a kit without a booster.

The Killer Paragraph and Static Points

The one Section in the Pink Book Sport scale rules that drives home the importance of data is 53.12, Static Points. Subsection 53.12.1 (Similarity of Outline) uses the absolute word “required” and further outlines the minimum data that is required to qualify the model. At its most lenient, the rule is interpreted to say that you MUST provide either a drawing or a photograph and it further goes on to state that if the data you DO provide is not of sufficient quality (implying anything from illegibility to data that is obviously bogus and inauthentic or obviously inaccurate) that the judges may disqualify your entry.

53.12.2 (Finish, Color, and Markings) indicates that the contestant “should” (a rather mild word) submit data substantiating color and markings and goes on to make some suggestions for documentation such as photos, magazine articles, or written descriptions from “reliable” sources including a drawing indicating colors and scheme that can be generated by the modeler (with the implication that this drawing is accurately rendered using recommended substantiating sources).

This section further offers a bit of leniency in that it stipulates that if there is no data substantiating finish, color, and markings that you shall receive no points (but no disqualification). But that’s throwing away the potential of a significant portion of 200 easy points!

Summing It Up...

Your Data Pack and its Presentation

Though you can get by with just a single photocopy or line drawing, there’s just too much at stake that can be thrown away by not taking an extra hour or two to properly assemble a data pack that the judge will find both complete and easy to use as a reference. In a nutshell, your data pack should contain enough information for someone who knows nothing about the prototype, other than what he finds in the pack, to build from scratch an accurate model of your chosen prototype.

My first recommendation is to collect all of the relevant data to do with your chosen prototype well in advance. Duplicate or copy it to a common format...usually 8 ½ x 11 letter format is the easiest, select the data that will be the most useful in helping to judge the model, and then assemble and bind it into a report cover, binder, or folder. You want to avoid loose pages if you can. I like ring-type binders because these will lay flat and leave the judges’ hands free to handle your model or take notes.

I recommend that it contain at least one line drawing with the basic dimensions...and make sure the dimensions are correct. Though Sport Scale does not make direct use of dimensions they lend authenticity to the data. If you generate a drawing on your own, be sure to include the materials that you used to generate the drawing in your data pack. The best thing to do, however, is to utilize drawing sources (such as copies of the original) other than drawings you do yourself. If the drawings contain generic data or data representative of rounds other than yours, you need to make note of this fact on your drawing and perhaps even go further to annotate the relevancy of those parts of the drawing that do apply to your prototype.

A photo or series of photos relevant to the specific prototype you are modeling. These should be neatly labeled and organized. Use a photo album page if the photos are small or if they are clippings or utilize a clear slipcover page (available at any office supply store) for larger photos (or drawings).

As to WHAT data you need, well, that depends on your prototype and the degree to which you have modeled it. Only include data that supports what you have actually modeled. If you show drawings that represent all kinds of panels, hatches, nuts, bolts, and weld lines, then they should be on the model. Conversely, if you put panels, hatches, nuts, bolts, and weld lines on the model, they should be represented in the data. In other words, for maximum points, the data and the model should exactly match. A data pack of a very simple model such as the Japanese Pencil can literally be a single line drawing with color data. Even though the model is not of complex shape, has no markings to speak of, almost no detailing, and very simple coloration and pattern it can score very high because of its simplicity both with respect to the physical model and the data required to accurately and fully document it to the scale judge.

Generally, three or four pages will be all you need to provide for a well-rounded data pack. However, if you have additional supporting data that can lend authenticity to these pages and photos, you can generally include them as a section of your data pack that is either a separate section in the back of your binder or you may include them in a separate binder. I would recommend that if you do include supporting data that you not include the “kitchen sink” (only include relevant supporting materials) and make notes on your primary data in the first three or four pages of your data pack where to look in the supporting data for additional supporting information.

Above all, don't alter or “doctor” any data or “enhance” or edit photographs other than perhaps improving contrast. Many judges are quite knowledgeable about specific photos and drawings and can easily discover (or at least have their suspicions aroused) if something doesn't quite “look right.” Also keep in mind that data that looks too good, particularly if it is “vintage” data from, say, the '50's or '60's, will become suspect in the eye of the judges. Likewise, artificially “aged” data can become equally suspect in its authenticity and accuracy.

I highly recommend you study and understand the NAR Sport Scale rules and put special consideration in what they require with respect to both required and recommended data. Even though, as I said earlier, the data pack gets no points, its completeness, clarity, and presentation can go a long way end helping you earn more points for your model.