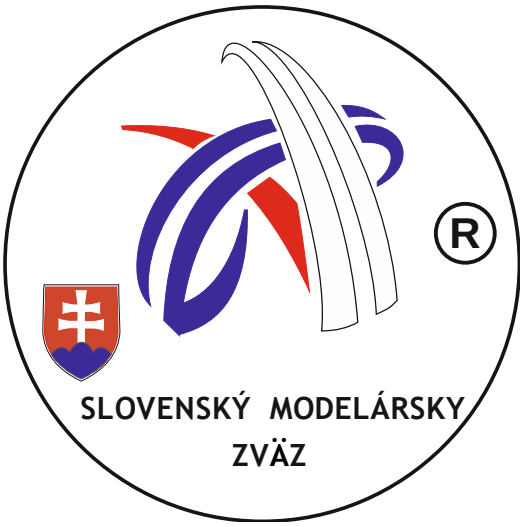
Big Rockets



Sports code

Valid since 1st January 2017

PART ONE - GENERAL DEFINITIONS

1.1. MODEL ROCKET

A „Rocket model“ is a flying craft, which takes off without the use of aerodynamic buoyancy to overcome the gravity and which is powered by a modelling rocket engine that contains a safety return device which allows a subsequent flight; it is predominantly made of nonmetalic materials.

1.2. MODEL ROCKET ENGINE

1.2.1„ The Rocket Model Engine is a reactive fuel engine, all the flammable chemical components in the fuel are mixed and prepared for use in advance.

1.2.2. HYBRID ROCKET ENGINE

Is an engine, in which one component (fuel – oxidant) is in a liquid or gaseous state and the other in a solid state.

1.3. MODEL CATEGORIZATION

R1	Single stage Elevation models
R1H	Single stage Elevation models powered by hybrid engine
R1T	Single stage Elevation models with diameter of 110mm
R2	Multistage Elevation models
R3	Maquettes
R4	Experimental flight models

PART TWO - ROCKET MODEL SPECIFICATIONS

A model rocket must meet the following requirements before launching, operating and flying:

2.1. WEIGHT

The total or maximal weight of a model rocket, including the engine or enigens, must under any circumstances not exceed 20.000 grams (20kg).

2.2. ENGINE PERFORMANCE

The overall impulse of the functional rocket engines placed in the model and used to its traction must not exceed 2.540 Ns.

2.3. FUNCTION LEVELS

2.3.1. The model must not have more than three (3) function stages. A stage is defined as part of the model, including one or more rocket engines, which is constructed to disengage or in actuality detaches during the flight. The layout of the model is considered to be all that is part of the model in the moments of its first motion on the ramp.

2.4. CONSTRUCTION REQUIREMENTS

2.4.1. The model rocket must be constructed to endure more than one flight and it must containt a medium which decelerates its descent to the ground and thus prevents it from being essentially damaged or endangering subjects or property on the ground. Braking means stands for a recovery system. For instance autorotatiton will suffice.

2.4.2. The model rocket must not detach its engine (enignes) during its flight unless it/they are not embedded in the body tube which returns to the ground according to the requirements in section 2.4.1. The engines must not be secured to the model by glue and must not be an integral part of the model's structure.

2.4.3. The structure of the model must be made of wood, paper, rubber, plastics or similar materials without vital metalic parts.

2.4.4. DEFINITION

Body is spatial geometrical object defined by two parallel bases and sheathing.
(Annex 5)

2.4.5. Minimal rocket sizes must not be less than:

Category **R1**	**Body diameter** 50 mm and more	**Min. length** 1.000 mm
Category **R1H**	**Body diameter** 50 mm and more	**Min. length** 1.000 mm
Category **R1T**	**Body diameter** 110 mm and more from the length of 750mm	**Min. length** 1.500 mm
Category **R2**	**Min.length** 1.500 mm	
Category **R2** First stage	**Body diameter** 75 mm and more	
Category **R2** Second stage	**Body diameter** 50 mm and more	
Category **R2** Tripple stage version	**Body diameter** 50 mm and more	
Category **R3**	75 mm and more *	**Min. length** 1.000 mm
Category **R4**	75 mm and more *	**Min. length** 1.000 mm

*One of the diameters of body has to comply to the criteria.

2.4.6. The model must have designed and made surfaces which provide stabilizing and returning aerodynamic forces, necessary to maintain a generally straight and assumed flight course. If safety committees or judges demand the entries of the model's CG postion, lifting point of action, total weight, fuel burn-out moment, calculated or measured flight performances the modeller must submit them.

2.4.7. The model rocket must not contain any type of explosive or pyrotechnical cargo.

PART THREE – GENERAL CONTEST RULES

3.1. MODEL COUNT

The acceptable signed up model count is the following:

Category R1 R1H R1T ..... three (3)
Category R2 ..... three (3)
Category R3..... two various types of maquettes (2)
Category R4 ..... three (3)

3.2. LAUNCH

3.2.1. ORGANIZATION

During every activity related to model rocket launches and flights all the competence and responsibilty for the safety and course of actions on the flying site is entrusted to a safety committee who must be older than 18 years. The safety committee may delegate his or her competences to a representative, who meets the above stated requierements but this mandate or temporary delegation of competences does in no way relieve him or her of any responibilities for the operations taking place on the flying site. Proportionally to the resources and equipment all the contestants in every category will be allowed to acquire engines and prepare their models under the supervision of functionaries.

3.2.2. FLIGHT APPROVEMENT

The flight of every operating model rocket on the flying site must be allowed or rejected explicitly by a safety commitee or his rightfully comissioned substitute based on a measured safety judgement of the model in flight.

3.2.3. DISCHARGING DEVICE

A discharging device or mechanism must be used, which prevents the model from moving horizontally until reaching a sufficient flight speed for an adequately safe and predictable flight. The degree of the release must be larger than 60° into the horizont. When the safety committee or his or her authorised substitute concludes the model may be safely and satisfactorily ignited and launched, the contestant unlocks the launchers. The launcher must be at least 25m away from the discharging device (ramp). Every person in the vicinity of the launch must be warned about the upcoming launch before the model rocket's ignition and launch. Before the ignition and launch of the model rocket there must be at least a five (5) second countdown.

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3.2.4. WEATHER CONDITIONS

The contest should be cancelled if the wind blows faster than 9 m/s for at least one minute measured 2 meters above the ground or if bad visibility makes correct model monitoring impossible or if atmospheric conditions render the contest dangerous.

3.2.5. In case a contest category is cancelled, it must be finished as soon as the conditions allow it, all the contestants and team leaders must be accordingly informed.

3.2.6. DANGER

The model rocket must not endanger any aircraft and it must not be used as a weapon against ground or aerial target.

3.3. CONTEST APPROACH

3.3.1. REGISTRATION

Before the first contest flight in any of the competing disciplines at least one of the models must be reviewed and marked by a judge and must be in compliance with the article 2.4.5. The following model may be reviewed during the contest.

3.3.2. MODEL MARKING AND IDENTIFICATION

Every registered model must have the contestant's starting number on a visible place of the body, stabilizer or other part of the outer surface.

3.4. VALID FLIGHTS

3.4.1. DEFINITION OF A VALID FLIGHT
A flight is valid after engine ignition, and after model has left the launching equipment. And if flight was in complience with articles 3.2.3 and 2.4.1 and 2.4.2.

3.4.2. FLIGHT COUNT
Every contestant in every discipline is granted the opportunity to perform three (3) official flights, if the weather conditions and time allow it.

3.5. DISQUALIFICATION
3.5.1. Judges may at any time disqualify any model which in their opinion does not correspond with the rules of the competition or which is deemed accordingly safe to operate by the safety committee or his or her authorised substitute.

3.5.2. Judges may disqualify any of the contestants if they do not apply and preserve adequate safety principles, written or other, for unsportsmanlike conduct, for disrespecting the orders of a safety committee or his or her authorised substitute or for generally inadequate behavour.

3.5.3. A crashed model which, according to the decision of judges, was not directly caused by a faulty design, structure or pre-flight model preparation will not be disqualified. A crashed model which is incapable of a consecutive flight may be replaced by another model.

3.5.4. The flight characteristics of a model may be a reason of disqualification for one flight, but it is not a reason for complete disqualification.

3.6. ALTITUDE DATA
3.6.1. Altitude measurement is ensured by an electric measurement device.

3.6.2. The organizator of the contest may demand a specific altimeter (e.g. Estes), in altitude categories the model must be adjusted to the placement of the altimeter according to the requirements of the manufacturer.

PART FOUR – ALTITUDE CONTEST CATEGORY R1

4.1. DEFINITION
In the altitude contest the reached altitude of a valid flight is measured, the model rocket is powered by a single **ROS-40 Ns** engine. The sum of the contestant's two best flights are ranking result.

4.2. ALTITUDE DATA
This contest uses section 3.6. Altitude data.

4.3. FLIGHT COUNT
Every competing model must perform a steady, roughly vertical flight or a flight according to beforehand listed data. The contestant has three (3) flights, provided the time and weather allow it.

PART FOUR – ALTITUDE CONTEST CATEGORY R1H (Hybrid rocket)

4.1. DEFINITION
In the altitude contest the reached altitude of a valid flight is measured, the model rocket is powered by a single **hybrid** engine. The sum of the contestant's two best flights are ranking result.

4.2. ALTITUDE DATA
This contest uses section 3.6. Altitude data.

4.3. FLIGHT COUNT
Every competing model must perform a steady, roughly vertical flight or a flight according to beforehand listed data. The contestant has three (3) flights, provided the time and weather allow it.

PART FOUR – ALTITUDE CONTEST CATEGORY R1T (Test rocket)

4.1. DEFINITION
In the altitude contest the reached altitude of a valid flight is measured, the model rocket is built in complience with article 2.4.5 and is powered by a single **ROS-40 Ns** engine. The sum of the contestant's two best flights are ranking result.

4.2. ALTITUDE DATA
This contest uses section 3.6. Altitude data.

4.3. FLIGHT COUNT
Every competing model must perform a steady, roughly vertical flight or a flight according to beforehand listed data. The contestant has three (3) flights, provided the time and weather allow it.

PART FIVE - ALTITUDE CONTEST CATEGORY R2

5.1. DEFINITION
This discipline is available only to multistage models (min. twostage version). The model rocket is powered by several engines with a total impulse of **200 Ns** maximum. The winning model of the altitude contest will be the one reaching the highest measured altitude. The sum of the contestant's two best flights are ranking result.

5.2. ALTITUDE DATA
This contest uses section 3.6. Altitude data.

5.3. FLIGHT COUNT
Every competing model must perform a steady, roughly vertical flight or a flight according to beforehand listed data. The contestant has three (3) flights, provided the time and weather allow it.

PART SIX – MAQUETTE CONTEST CATEGORY R3

6.1. DEFINITION
The maquette contest is an individual flying model rocket discipline, that are authentic models of existing or hostorically directed missiles, rocket or cosmic vehicles. The ranking is the sum of scale qualities and flight, of two various types of maquettes the contestant's better scored model is considered.

6.2. MULTISTAGE MODEL

If the competing model is a multistage rocket maquette, it can be contructed so that one or more of its upper stages are not functional. The upper stage of a multifunctional rocket cannot be signed up to compete and launched without its functional lower stages if the judges are not provided with corresponding data which approves the structure of the uppers stages was designed to fly individually or that it flew separately as an independent rocket. For instance all Aerobee rockets must have functional launching engines (boosters).

6.3. PROTOYPE SELECTION
The contestant must build a prototype of a specific model of a single serial number, unless the protorype was made in mass production so there is no existing individual rocket which could be selected to be scale processed. Even so, the contestant must do everything in the extent of possibiliest to build a single, specific prototype.

6.4. TEMPLATE SEMBLANCE VERIFICATION
The contestant must provide supporting evidence of the authenticty of his or her model about parameters, shapes, colours and a color scheme. The minimal acceptable data consists of the length and diameter of the prototype and one photograph. Futher data is naturally required. The parameter entry must be confirmed by a credible source such as magazines, books, technical documents or factory parameter charts, etc. Photographs from any sources are acceptable. All the data must refer to a specific rocket which is the prototype to the signed up model.

6.5. BUILDING KIT
Flight maquette building kits may be used during maquette construction and are allowed only if they are supplemented by documents other than those coming with the kit or ones provided by the manufacturer of the kit. The contestant is obliged to verify the scale quality of the building kit, is obliged to provide satisfying evidence of the of the authenticty of his or her building kit.

6.6. STABILIZERS
Rocket maquettes, missiles or cosmic vehicles, which are not aerodynamically stabilized by stabilizers may be equipped by transparent plastic elements in order to keep the model stabilized during its flight at the minimal loss of scale quilities.

6.7. MODEL STATUS DURING EVALUATION
Scale processing will be evaluated on models ready for flight without model rocket engines. Every transparent stabilizer, leash and other flight component must be attached to the model during evaluation.

6.8. PROCESS OF EVALUATION AND THE EVALUATION COMMISSION
Model evaluation is realized by three (3) judges from the distance of 1 metre. It consists of two phases (static and flight) prior to criteria listed below and its result is the model's point evaluation, registered in a score chart. The evaluation is executed individually by every judge and according to the point system of the supporting documentation provided by the contestant. Judges measure the model under the supervision of the contestant. During the evaluation, the contestant rotates the model by 90° in accordance with the instructions of the judges and asnwers their questions.

6.9. MODEL ADMISSION
The organizer marks spots where the contestant places the competing model and its supporting documentation. Further manipulation of the model is conducted only by the contestant under the supervision of a qualified judge.

6.10. FLIGHT COUNT
Every competing model must perform a steady, roughly vertical flight or a flight according to beforehand listed data. The contestant has three (3) flights, provided the time and weather allow it..

6.11. SCALE QUALITY SCORING
Points for quality scalng will be awarded to every signed up model according to the following system:

6.11.1. **Technical documents** maximum **10 points.**
Because the maquette is a replica of an existing rocket, the technical documents must confirm this fact. The mechanical drawing, pictures, sketckes and photographs must show every detail on the model.
The contestant who provides the following technical data may gain 10 points:

- an authentic, authorized threedimensional mechanical drawing of the model template with at least five parameters, as well as data that defines colours and symbols of the model from these viewvpoints;
- at least one color photograph of the whole model template with clearly visible details of coloring and symbols;
- at least three photographs of details and compositions;

6.11.2. **Template match – scale quality:** maximum **15 points**.
For the model to be considered a maquette, the parameters of its body, total length must not differ from the parameters of the model template in the selected scale more than 10% otherwise the model is disqualified. In this section of evaluation the diameter of the body, length of the body and and total length are taken into account – maximum 15 points.

6.11.3. **Craftsmanship quality:** maximum **25 points**.
Points are granted for precision, careful treatment and quality of the surface layout. For quality craftsmanship which on the other hand diminishes the model's credibility – for example a high-gloss surface instead of a required matt or rough surface, points will be taken away.

6.11.4. Degree of difficulty: maximum **10 points**.
The degree of model construction difficulty is evaluated. The model's symmetry, amount of external components, complexity of the color scheme, degree of detailed elaborateness and degree of difficulty, modification to flight are all evaluated factors.

6.11.5. Flight characteristics: maximum **40 points**.
Evaluates launch, flight stability, functions of subsequent stages (if there are any) and recovery. The contestants must specify which functions their models perfrom during their flight (for example the separation of stages, radio course of the flight course, payload ejection, etc.)

6.11.6. If the model performs at least one valid flight, the awarded points during both static and flight evaluation will be summed up. The flight evaluation points are applied only once (higher score).

6.11.7. If the model was disqualified in three valid flights, only static evaluation points will be used in the final ranking of the contestant.

PART SEVEN – "OPEN" ROCKET CONTEST - CATEGORY R4

7.1 DEFINITION
The "OPEN" rocket contest models are models of non-existent rockets in reality, meaning models of one's own design (e.g. experimental, futuristic, sci-fi, ...). The aim of this contest is to reach the highest possible score. The contest will be won by the contestant, whose model gets the highest score. The ranking is created by the sum of points for design, technological advancement of the model and its flight, out of three models the one with the highest score will be taken into consideration.

7.2. SCORING IN THE „OPEN" ROCKET CONTEST
7.2.1. Flight characteristics: maximum **30 points.**
The launch, flight stability, performed script and recovery are evaluated. Contestants must present the script of the flight in advance (for example the separation of stages, radio course of the flight course, payload ejection, etc.) on the registration card.

7.2.2. Model desing: maximum **10 points**
Evaluates the overall design of the model rocket (for example the processing, shape of the model, color scheme, etc.).

7.2.3. Technological advancement: maximum **60 points**
The technological advancement and difficulty of the model is evaluated (for example the amount of engines, type of rocket fuel, recovery system, use of electronics, payload, splitting of the rocket, booster separation, etc.)

7.3. PROCESS OF EVALUATION AND THE EVALUATION COMMISSION
Before the flight the contestant must provide the model's supporting documentation (construction drawing, not necessarily in scale) which depicts its construction and main parameters. Both CP and CG must be marked in the documentation and on the model.
The registration card must containt a short script of the flight.
The evaluation is executed by three (3) independent judges, who register the result to a score chart.

7.4. MODEL ADMISSION
The organizer marks spots where the contestant places the competing model and its supporting documentation. Further manipulation of the model is conducted only by the contestant under the supervision of a qualified judge.

7.5. FLIGHT COUNT
Every competing model must perform a steady, roughly vertical flight or a flight according to beforehand submitted script.The contestant has three (3) flights, provided the time and weather allow it..

7.5.1. If the model was disqualified in three vaild flights, only points for design, technical advancement will be used in the final ranking of the contestant.

ANNEX 1

CONTEST CARD

Contest Number	Competitor Name		
Class **R1**	Country		
Take overed model			
1 st Mark	1 st Mark		2 nd Mark
Round	1	2	3
Attained altitude			
Altimeter number			
Judge signature			

CONTEST CARD

Contest Number	Competitor Name		
Class **R1H**	Country		
: Take overed model			
1 st Mark	1 st Mark		2 nd Mark
Kolo Round	1	2	3
Attained altitude			
Altimeter number			
Judge signature			

ANNEX 2

CONTEST CARD

Contest Number	**Competitor Name**		
Class **R1T**	**Country**		
Take overed model			
1 st Mark	**1 st Mark**		**2 nd Mark**
Round	**1**	**2**	**3**
Attained altitude			
Altimeter number			
Judge signature			

CONTEST CARD

Contest Number	**Competitor Name**		
Class **R2**	**Country**		
Take overed model			
1 st Mark	**1 st Mark**		**2 nd Mark**
Round	**1**	**2**	**3**
Attained altitude			
the number of stages			
Altimeter number			
Judge signature			

ANNEX 3

REGISTRATION CARD

Class	**R3**	Contest number	
Competitor name			
Country			
Prototype name			
Prototype serial No		Scale	**1:**
Operating stages		Number of engines	
	Signature		

Total results

Static points	
Flight charasteristic	
Total	

Disqualifications

6.1. The prototype is not a missle, rocket or space vehicle

6.2. Entry has no lower stage (multi stage vehicles only)

6.4 No lenght and or diameter data supplied for prototype

6.7. Entry not submitted in flight configuration

Scale Judge No.1 Scale Judge No.2 Scale Judge No.3

Scale adherance

%Deviation Difference x100 Scale dimension=(B-C) x 100 / B One dimension = maximum of 5 points	1% Deviation 5 points 1 – 1,99% 4 points 2 – 3,99% 3 points 4 – 5,99% 2 points 6 – 9,99% 1 point 10% and more 0 points

Scale adherance	Prototype dimension		Scale dimension	Measured dimension	Difference	Deviation %	Points
	A						
	inches	mm	B	C	B - C		
Body diameter							
Body lenght							
Overall lenght							
Total points					Max. 15		

Technical data

Sub – category		Points	Judges		
			1	2	3
PROTOTYPE DRAWING	Authentic, authorised drawings	0 – 1			
	Data which define colour and markings on it	0 – 1			
PROTOTYPE PHOTOGRAPHS	At least one colour photograph of the prototype with cearly visible details	0 – 1			
	At least three photographs of details and asseblies 3 photographs 1 point 6 photographs 2 points 9 photographs 4 points 12 photographs 5 points 12 and more 7 points	0 – 7			
Total points		max 10			

Degree of difficulty

Sub – category		Points	Judges		
			1	**2**	**3**
DEGREE OF DIFFICULTY	Configuration	0 – 5			
	External components	0 – 3			
	Flyability	0 – 2			
Total points		**max. 10**			

Workmanship

Sub – category		Points	Judges		
			1	**2**	**3**
CONSTRUCTION	Nose cone and transitions	0 – 5			
	Body segmentation model (trunk diameters, taper, transitions)	0 – 5			
	Details Simple details 1 point Intricate detils 3 points A large number of details 10 points	0 – 10			
FINISH	Nose cone & transitions	0 – 2			
	Body	0 – 3			
Total points		**max 25**			

Flight characteristics

Sub – category			Points	Fly	Judges		
					1	2	3
L A U N C H	Each misfire or hang-fire One ignition engines	1 point	0-5	1			
				2			
				3			
	Realism of launch Effect at the start	1 point	0–5	1			
				2			
				3			
FLYGHT	Flight Approximately normal, direct and regular flight		0–5	1			
				2			
				3			
	Special effects Made for each effect	1 point	0–10	1			
				2			
				3			
	Staging Second stage Third stage	2 points 5 points	0–5	1			
				2			
				3			
ENGINs	Clusters One engine	1 ponit	0–5	1			
				2			
				3			
R E C O V E R Y	Recovery device deployment One recovery device Autorotation, streamer	1 point 0 point	0–5	1			
				2			
				3			
Total points			**max 40**				
Remarks (crash of engine, disqualification reasons							

ANNEX 4

REGISTRATION CARD

Class **R4**	Contest number		
Competitor name			
Country			
Model name		Number of engines	

Visage of Model

Sub – category			Judges 1	2	3
DEGREE OF DIFFICULTY	Configuration				
	External components				
	Colour and markings				
Total points		**max. 10**			

Flight characteristics

Sub – category		Let Fly	Bodovači Judges 1	2	3
LAUNCH	Each misfire or hang-fire One ignition engines	1			
		2			
		3			
	Launch Effect at the start	1			
		2			
		3			
	Flight Approximately normal, direct and regular flight	1			
		2			
		3			
	Recovery device deployment One recovery device Streamer	1			
		2			
		3			
Total points		**max. 30**			

Technical Sophistication

Sub – category			Fly	Judges		
				1	2	3
ENGINS	Clusters		1			
			2			
			3			
	Rocket propulsion Hybrid Engine Solid engines		1			
			2			
			3			
RECOVERY	Recovery device deployment Parachute Gyroplane hang-glider Combined recovery device		1			
			2			
			3			
	Recovery system Timer recovery system Radio recovery system		1			
			2			
			3			
ELECTRONICS	Staging Ignition stage radio Stage ignition timer		1			
			2			
			3			
	Use electronics The electronic collection years. data Video or photo camera model (recording or photos from flight) Radio control flight		1			
			2			
			3			
FLIGHT PROCEDURES	Special Effects Rocket Separation Nose Cone Separation Payload Booster Separation		1			
			2			
			3			
Total points		**max. 60**				

Total results

Visage of Model	
Flight charasteristic	
Technical Sophistication	
Total	

ANNEX 5

BODY ROCKET

By two parallel bases and sheathing