



New Flying Competition

Created by Neues Fliegen e.V.

At Hamburg University of Applied Sciences

www.newflyingcompetition.com

Rules and Regulations

Period 2015 - 2016

Version: 20160508 – update 3

**Now supported by
Airbus Deutschland
with special privileges
for participating
students**

Organizer

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1 Introduction

The scientific model flying competition „New Flying Competition“ was created by the registered student association „Neues Fliegen e.V.“ in 2015. In the first competition to be held real world industrial aircraft design criteria and real world aircraft design processes are to be applied to model aircraft design. During the competition the participating university teams are applying scientific rationale and methods which are to be documented in design reports.

Following aspects play a major role:

- To apply a real-world aircraft design process and real world design criteria to a model aircraft.
- To apply the knowledge and competences acquired at the university in practice.
- To improve the competitors' soft skills

2 Supporters and Sponsors

We are proud that

- Airbus Deutschland

is actively supporting the New Flying Competition with exclusive privileges for participating students:

Fabian von Gleich, Head of Strategy and Development Site Hamburg, Airbus Germany:

“We believe that this competition is an excellent opportunity for future aircraft engineers to gain valuable experience in the field of applied aircraft development. Students participating in this competition will have the privilege to exchange directly with some of Airbus' leading engineering experts. We explicitly encourage all competing teams to explore unconventional aircraft concepts or new ways of working related to aircraft development and testing. We are looking forward to see what Airbus can learn from the competing teams as well. Finally, we also excited to meet talented students and support them in their personal and professional development.”

We are very happy that the New Flying Competition is also sponsored by global players such as:

- Lufthansa Technik AG, Hamburg

Elke Niemann, Talent Relationship Management and University Contacts:

The competition offers us a new possibility to get in contact with students and aviation enthusiasts. I'm excited how competitors will apply innovative technology and which kind of knowledge they will acquire along with the competition.”

- Center for Applied Aeronautical Research, Hamburg

Roland Gerhards CEO of ZAL (engl.: Hamburg's Center for Applied Aeronautical Research):

When I first heard about the idea of the competition, I was immediately excited. It is an enrichment to help students and interested model flyers participate in realizing the vision of new flying and it also supports the networking. With the strong focus on innovation and the creativity this competition also suits ZAL. That is why I agreed on becoming a member of the Advisory Council.”

- Hamburg Aviation e.V.

Dr. Franz Josef Kirschfink, CEO of Hamburg Aviation:

The Aviation Cluster appreciates this competition as an additional incentive for awaking enthusiasm of academic young talents for our branch of industry. It is a novelty, that people from outside the industry compete in designing innovative and airworthy technical demonstrators. That's why I pledged to support the competition on behalf of Hamburg Aviation."

3 Committees

3.1 Advisory Board

The Advisory Board defined the competition task. Members of the Advisory Board are representatives of the business sponsors:

- Lufthansa Technik AG, Hamburg
- Center for Applied Aeronautical Research, Hamburg
- Hamburg Aviation e.V.

3.2 Competition Committee

The Competition Committee decides on protests submitted by team or on the disqualification of a team. Please refer to chapters Disqualification and Notes for more information. Members of the Competition Committee are:

- one member from the advisory board,
- one jury member,
- one representative of the organizer.

3.3 The Jury

The jury consists of representatives of the sponsors mentioned above.

4 Participating in the Competition

4.1 Prerequisites

The listed prerequisites must be met by each team/team member for participating in the competition:

- The number of team members is limited to 10 students excluding the pilot. All student team members must be registered Bachelor or Master students at the time of registration for the competition. Each student team member must be able to provide a valid certificate of matriculation.
- Each team requires a model pilot, who owns a model flying insurance valid in Germany. The model pilot has not to be a member of the participating university.
- The team members can be students from a single university or from co-operating universities. However, the maximum number of team members mentioned above must not be exceeded.
- More than one student team from a single university or co-operating universities may register.
- Each student team nominates a team captain who is representing the team during the competition. All official communication between the team and the organizers or committees goes via the team captain.

- Each student team nominates one faculty member who is supporting the team. The university professor is not a member of the student team and acts as an official university representative.
- A co-operation between a student team and a model flying club is recommended.
- The total number of teams taking part in the competition is limited to 20.

To apply and register for the competition use the application form on

www.newflyingcompetition.com/apply

Note the registration steps listed on that internet page.

Dead line for the registration is December 30th, 2015. No team will be accepted after the deadline. The following requirements are a pre-requisite for the registration.

- Register before December 30th, 2015.
- The registration form must be completely filled-in and signed by the team captain and all team members.
- Certificates of matriculation of each student team members has to be sent along with the registration form.
- The transaction of the registration fee must be confirmed by the organizer.

4.2 Registration Fee

The fee for participating in the competition consists of a lump sum per Team independent of the number of team members and an amount per person in the team.

Item	€	Comment	Type
Starting fee	1000	Per Team	Compulsory
Meals and transportation	110	For 3 days: lunch and dinner Transport for 3 days	Compulsory
Accommodation	27	Per night and per person Shared room in a youth hostel including breakfast	Optional Subject to availability

Bank details:

Recipient: Neues Fliegen e.V.

Bank name: Hamburger Volksbank

Account: 2323001

IBAN: DE46201900030002323001

BIC: GENODEF1HH2

5 Challenge

The competition's goal is to design, build and fly a model of a civil aircraft. The airplane configuration is not predetermined and is therefore left to a team's discretion. This means it is possible to design both conventional and unconventional configurations (e.g. classical wing-fuselage configurations or box wing-, flying wing- or blended-wing-body configurations.)

The challenge is to comply with criteria occurring in real-world design processes. Based on typical reports from the aviation industry, the competitors must keep a record of their development progress.

The overall competition consists of a series of challenging flight manoeuvres, a science slam video and design reports.

The competition will be embodied in an exciting programme realised by our sponsors.

5.1 Design Reports and Science Slam

Each team has to submit three design reports and a science slam video within the period stipulated. Submission of all design reports is a prerequisite for the competition flights. Design reports and science slam video must comply with the guidelines given on

www.newflyingcompetition.com/download

Report	Deadline for submission
Preliminary Design Report – PDR	February 15 th , 2016
Critical Design Report – CDR	May, 16 th , 2016
Final Design Report – FDR	August 15 th , 2016
Science Slam video	September 19 th , 2016

5.2 Model Specification

Item	Specification	Remark
Aircraft type	Civil Aircraft of any configuration	Conventional, Box Wing, Blended Wing Body, Flying Wing, others
Airframe	Detachable, components	Components shall fit into a box no longer than 2,5m
	Wing span and fuselage length are not specified by the regulations	
	Max. take-off weight < 23kg	Likely take-off weight is appr. 10kg.
	Structural strength to withstand looping and landing on solid runway.	
	Metal plate must be fixed to the airframe with engraved information on: Name, address, country	German law
Propulsion	Electric propulsion	Over-the-counter products, only.

	Multi-Engine	Propeller/Impeller
	Battery: Li-Po 37V 5Ah (10S)	Detachable for recharge
	Means to demonstrate that critical engine is deactivated during flight 1	
	Physical safety switch (circuit breaker) to prevent unintended engine start.	Mandatory
Payload and trim weight	Three alternatives	Refer to the following chapter for more details
Electronics	Over-the-counter-items	
	Standard radio control system 2,4GHz	Certified for a use in Germany, with max. EIRP = 100mW.
	On-board GPS-Logger for speed and distance	
	Gyro-Systems accepted	

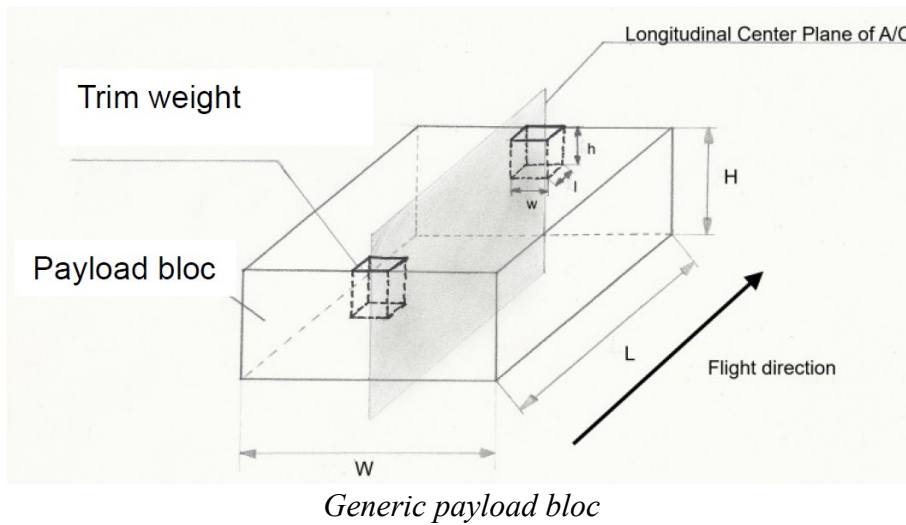
5.3 Payload and Trim Weight

The model must be capable to carry a payload with a mass of 1,8 kg plus a trim weight of 0,2 kg. The payload is of box-form with dimensions given below and has to be made from Styrodur. The team has to choose one payload box from the variants given in the table below.

The payload box has to be equipped with a front and an aft pocket for the trim weight. Refer to the table below the dimensions of the trim weight.

Alternative	Payload bloc - PLB			Trim weight - TW		
	Length [mm] L	Width [mm] W	Height [mm] H	Length [mm] l	Width [mm] w	Height [mm] h
1	1800	240	140	30	100	100
2	1200	360	140			
3	900	480	140			
Dimensions listed above are minimum dimensions, measured with standard steel ruler. No downward-tolerance.						
Mass [kg]	1,8			0,2		
Minimum weight, no downward-tolerance If weighing shows the need for extra weight, than ad-hoc adaption is permitted until specified payload weight is met.						

PLB and TW must be fully enclosed by the fuselage. The fuselage has to be designed such that PLB and TW can be removed. Both, PLB and TW have to be fixed during flights.



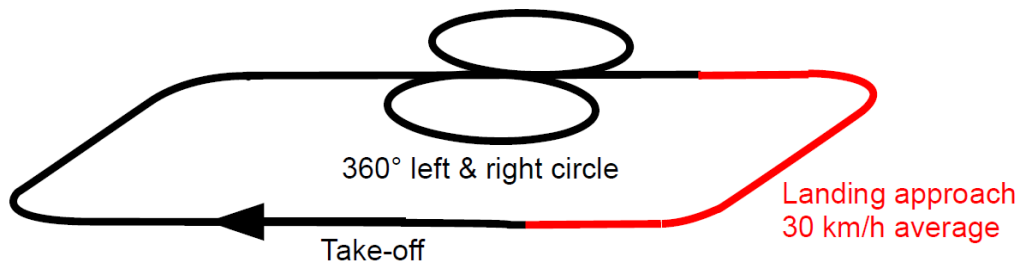
5.4 Competition Flights

Phase	Task	Monitoring		
Charging	Charge battery with charger	By jury		
Flight 1	Critical engine deactivated (It is permitted to deactivate another engine as well)	By jury Speed logged via GPS-Logger Type of GPS-Logger to be specified.		
	Trim weight in forward position			
	Take-off against wind direction, no external take-off device allowed.			
	Flight pattern: <ul style="list-style-type: none"> • 360° left and 360° right turn circle on downwind leg • Decelerate to demonstrate low-speed of 30km/h (average air speed) after circles • Landing approach • Land against wind direction 			
	Confirm critical engine was deactivated			
	If it is difficult for the jury to identify the critical engine (e.g. aircraft with one stronger engine on centre-line and 4 weaker engines on wing) then flight 1 needs to be performed twice with each of the potentially critical engines deactivated in one flight (in above example the most outboard and the strongest). In this case a recharge before the second flight is permitted			
	Stop over		No recharge (see comment above) Small repairs permitted	By jury member
	Flight 2		Trim weight aft position	By jury member Speed and distance logged my
All engines can be used				
Take-off against wind direction, no external take-off device al-				

	lowed.	GPS-logger
	Flight pattern:	
	<ul style="list-style-type: none"> • One full looping (preferably against wind direction) 	
	<ul style="list-style-type: none"> • Straight, parallel phases headwind & downwind at an average air speed of 60 km/h. • Landing approach after 10 min flight time. 	
Post flight	Recharge battery with same charger, measure recharge energy	By jury member
	Average speed during flight 2 and during approach of flight 2 estimated from GPS-data	By jury
	Distance flown during flight 2 estimated from GPS-data.	
	Specific energy consumption calculated (total recharged energy)/(distance flown in flight 2)	

5.4.1 Flight Pattern of Flight 1

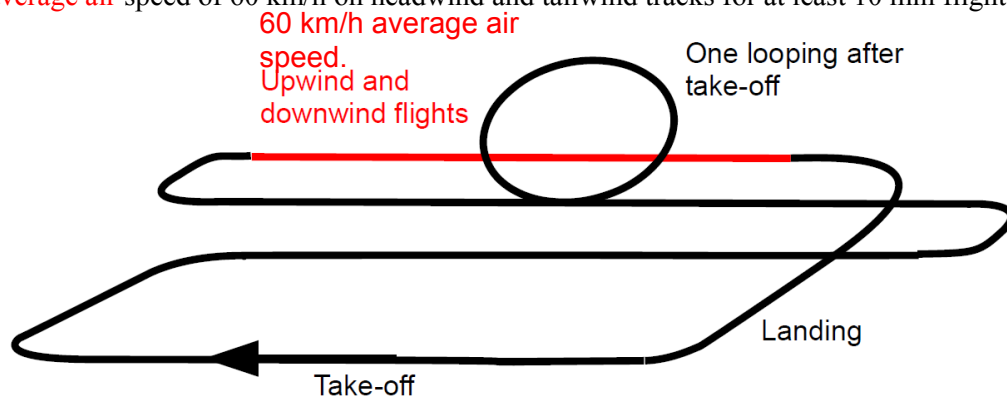
During flight 1 the trim weight is at the forward position, demonstrate take-off from runway, fly one 360° left circle and one 360° right circle. Demonstrate average air speed of 30 km/h during approach. The critical engine is inoperative all the time.



Flight pattern of flight 1.

5.4.2 Flight pattern of Flight 2

During flight 2 the trim weight is at the aft position. Demonstrate a looping after take-off, hold a minimum average air speed of 60 km/h on headwind and tailwind tracks for at least 10 min flight time.



Flight pattern of flight 2.

5.5 Scoring

To be defined and published soon.

5.6 Transportation Box

The maximum dimensions and weight must not be exceeded for handling reasons. Please note specific airline regulations or other regulations that may exist if your are using surface transport.

Length [m]	Height [m]	Width [m]	Mass [kg]
2,5	0,6	0,6	32

You will be notified in due time where the transport boxes have to be sent to. The transport boxes have to arrive at the address given one day before the pre-check day.

6 General Time Table of the New Flying Competition

Date	Activity	Remark
December 30 th , 2015	Deadline for registration.	
February 15 th , 2016	Submission: Preliminary Design Report – PDR	
May, 16 th , 2016	Submission: Critical Design Report – CDR	
June 30 th , 2016	Announcement of science slam topic by advisory board.	
August 15 th , 2016	Submission: Final Design Report – FDR	
September 19 th , 2016	Submission: Science slam video	
Competition Flights scheduled mid October		
Tuesday	Mandatory model pre-check with respect to: <ul style="list-style-type: none"> damages safety and security issues 	By jury member Mandatory: Teamcaptain and model-builder have to be present. Repairs permitted.
Wednesday	Mandatory model pre-check with respect to: <ul style="list-style-type: none"> damages safety and security issues 	By jury member Mandatory: Team captain and model maker have to be present. Repairs permitted.
Thursday	Registration of teams	Student team members, pilot Supervising professor, if present
Friday	Science Slam Company visits	

	Social event	
Saturday	Competition flights	
Sunday	Competition flights	
Debriefing	For winner teams	By jury at Hamburg or via video/telephone conference

7 Communication

The team captain is the focal point for all official communication between the organizers, jury and the team itself. The team captain is responsible for passing these information on to the team and supervising professor.

Changes to certain aspects of the Rules & Regulations might occur. These will be communicated to the team captain, only.

8 General Conditions and Agreements

- Photos, videos and audio comments are taken during the competition. Each participant in the competition grants to the organizer, to the sponsors and to the organizer a royalty-free, non-exclusive and unlimited license to use this material for their own purposes.
- Each team member grants the sponsors and jury members a royalty-free, non-exclusive and unlimited license to use the submitted design reports and science slam video for their own purposes.
- Each team member gives the right to the organizer to transmit the name and contact data to the sponsors.
- Each team member has to follow the rules of the house/rules of the location.
- Each team member agrees to co-operate with the safety and security personnel and to follow the instruction of the person in charge.
- Each team member has to treat all equipment provided in a careful manner. Damage to other persons or to equipment provided by a team member are within the responsibility of that person/team.

9 Disqualification

Disqualification does not lead to a reimbursement of neither the participation fee nor fees paid for transport, accommodation, catering. Disqualification is decided by the competition committee with

- one member from the advisory board,
- one member from the jury,
- one representative of the organizer.

A team will be disqualified if:

- The team pilot does not possess a model flight insurance policy that is valid in Germany. A proof has to be provided by the first flight day.

- If a photo or film was not provided in due time of a static wing loading test and flight of a looping.
- If the aircraft does not meet the model specifications,
- If the model does not meet safety and security requirements.

10 Notes

10.1 Omitted Cases

The organizers should make all efforts in order to provide comfort to all teams during the development process and during the competition. The organizer will treat all teams equally. All matters not mentioned in this regulation will be analysed and decisions will be made regarding fairness and equality of all teams.

The organizer has the right to change the regulations at any time. The team captain will be notified about the changes and an updated version of the Rules & Regulations is provided on

www.newflyingcompetition.com/download

Drafts of upcoming changes may also be provided by the organizer.

10.2 Protests

The teams have the right to protest against the decisions made by the organizer.

Protests are considered as a serious matter. Protests are to be submitted to the Competition Committee at any time during the competition in writing and signed by the team captain. No protests are accepted after the conclusion of the competition.

The Competition Committee decides on the protest and actions to be taken. Unjustified protests will end in a score penalty. The decision of the Competition Committee is final.

The Rules & Regulations as well as any decision of the jury cannot be the target of a protest.

11 Change Log

Changes to the previous version are marked in red.

Version 20151013: First edition of R&R.

Version 20151106: Update 1

New chapter 2: Supporters and Sponsors

Chapter 4.1: faculty member instead of professor

Chapter 5, paragraph 3: new wording

Chapter 5.3: trim weight dimensions

Chapter 5.4: Order of flight manoeuvres changed.

Chapter 10.2: Penalty specified.

Version 20151118: Update 2

Chapter 5.4 , 5.4.1 and 5.4.2: Air speed introduced

Version 20160508 Update 3

Refer to the additional file in the download area. Updates refer to the battery, safety switch, PLB and TW.