



*Fédération
Aéronautique
Internationale*



CIVA Rules, Judging, and Glider Aerobatics Committee Meetings

Rules Proposals for 2018 (Power and Glider Aerobatics)

**GAC Meeting to be held in
Toruń, Poland
25 July 2017**

**Joint RC/JC Meeting to be held in
Chotěboř, Czech Republic
5 August 2017**

Version 1.0 / 12 July 2017

INTRODUCTION

The deadline for the submission of rule proposals to CIVA (1 July 2017) has now passed. CIVA Delegates responded accordingly and these proposals now go to Committees.

This is one of CIVA most important jobs; to examine our experiences and lessons learned from the various Championships we hold each year and to introduce improvements into the FAI Sporting Code, the rules that are the basis for our sport.

Proposals can take four different forms:

Normal Proposals (NPs): These are proposals submitted each year by Delegates in accordance with our normal rules process and deadlines. These are normally due by the 1st of July. By extension such proposals may be submitted on request of CIVA by specially appointed Working Groups.

Safety Proposals (SPs): Proposals to be submitted which relate to safety problems and merit consideration by plenary at CIVA's next meeting. These usually come in after Championships.

Expedited Proposals (EPs): Proposals to be submitted as a result of experiences at Championships and merit discussion by plenary at CIVA's next meeting. The guideline here would be minor changes which do not require full Committee consideration.

Correction Proposals (CPs): Purely editorial remarks (e.g. typos, missing reference,...). Such proposals may be sent anytime to the RC or GAC Chairman as appropriate, and implemented as relevant in the next issue of Section 6' corresponding Part without going through the full-fledged approval process, and hence save time in RC/JC/GAC discussions as well as in CIVA's plenary meeting. Proposals are classified as CP by the RC (respectively GAC) Chairman; however if anyone of the respective Committee members objects to this classification, the proposal automatically goes into NP status.

“Urgent” proposals submitted after Championships, in accordance with a deadline set by the CIVA President each year, are classified as a SP, EP, or NP (and in this latter case set to be examined by the relevant Committees in the following year), at the discretion of the President.

CIVA has the following rule related Committees, elected each year at Plenary, and made up of skilled and experienced specialists. Each has five members plus a Chairman. The committees in 2017 are as follows:

- CIVA Rules Committee (RC): Matthieu Roulet, Chairman (FRA)
- CIVA Judging Committee (JC), John Gaillard, Chairman (SAF)
- CIVA Glider Aerobatic Committee (GAC), Manfred Echter, Chairman (GER)
- CIVA Catalogue Committee (CC), Manfred Echter, Chairman (GER)

The GAC meeting on Toruń airfield on 25 July, as well as the joint RC/JC meeting in Chotěboř on 5 August, will be open to observers. Observers however are not allowed to participate to the debates unless invited to do so by the Chairman on a specific topic. For logistics purposes, Delegates are requested to let the respective Chairman know as soon as possible whether they foresee any observers from their respective NACs.

The RC/JC on the one hand, and the GAC on the other hand, will strive to harmonize decisions on rule proposals wherever this makes sense, in order to avoid as much as possible diverging options in Parts 1 and 2.

Comments on the enclosed rule proposals are welcome. After holding their meetings in the summer of 2017, the Committees will issue their recommendations to the Plenary meeting of CIVA. That meeting will be held in Aix-en-Provence, France, on 4-5 November 2017.

The new version of Sporting Code, incorporating those changes, takes effect on 1 January 2018.



Matthieu Roulet
Chairman, CIVA Rules Committee

12 July 2017

RC 2017:

- *M. Roulet (Chairman)*
- *N. Buckenham*
- *E. Klimovich*
- *Ph. Kùchler*
- *J. Leukefeld*
- *P. Varloteaux*

JC 2017:

- *J. Gaillard (Chairman)*
- *N. Buckenham*
- *B. Howard*
- *Ph. Kùchler*
- *M. Mamistov*
- *P. Varloteaux*

GAC 2017:

- *M. Echter (Chairman)*
- *M. Delcroix*
- *P. Havbrandt*
- *Ph. Kùchler*
- *J. Makula*
- *F. Toth*

CC 2017:

- *M. Echter (Chairman)*
- *A. Belov*
- *M. Delcroix*
- *P. Havbrandt*
- *B. Howard*
- *P. Varloteaux*

RULES PROPOSAL CHECKLIST

Highlighted in Yellow: Proposals for which the GAC and the RC/JC should aim for a common position.

CIVA#	NAC	#	Subject	S/C or WG	Page
NP2018-1	FIN	1	Number of figures in Free Known	RC / GAC	4
NP2018-2	FRA	1	Signalling Procedures when start in inverted flight	RC	5
NP2018-3	GER	1	Height Limits	GAC	6
NP2018-4	NOR	1	Optional Roll elements in P-Loops	CC	7
NP2018-5	RUS	1	Box Marks : Arrow Signs	RC	8
NP2018-6	UK	1	Aircraft restrictions in Intermediate	RC	9
NP2018-7	FPS WG	-	FPS Working Group Proposal	RC /JC / GAC / Plenary	11

NP2018-1

RC

GAC

**FINLAND PROPOSAL #1**

Document: Section 6 Part 1 / Part 2

Subject: **Number of figures in Free Known****Proposal**

Alteration for Sporting Code Section 6 Part 1 :

2.2.1.1. Sequences for the Free Known Programme will be composed of figures or combinations of figures (a combination being taken as one figure) selected from the Aresti System (Condensed) as follows:

- a) Five (5) figures from a Known 'master set' selected at the CIVA plenary each year for each category, used in any order and at any position in the sequence with their start direction into-wind, down-wind or cross-wind in either direction as desired, with their design unchanged;
- b) **Plus five to seven (5-7) Free figures that each competitor must add, in order to design a sequence of ten to twelve (10-12) figures that satisfies regulations below.**

Alteration for Sporting Code Section 6 Part 2

2.2.1.1 Sequences for the Free Known Programme will be composed of figures or combinations of figures (a combination being taken as one figure) selected from the Aresti System (Condensed) as follows:

- a) Five (5) figures from a Known 'master set' selected at the CIVA plenary each year for each category. The five Known figures will be identified by letters "A" through "E" on all sequence forms for Programme 1.
- b) **Plus five to seven (5-7) Free figures that each competitor must add, in order to design a sequence of ten to twelve (10-12) figures that satisfies regulations below.**

Rationale

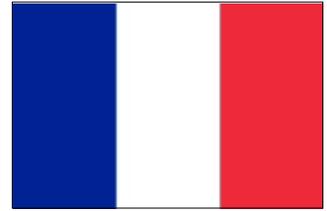
The free known program change is still strongly opposed in USA and Nordic countries (Norway, Sweden, Denmark, Finland), and they still use the old rule in their national competitions (known + free programs). The reason for opposing Free Known program is that it gives advantage to more powerful, newer generation aircraft, and effectively prevents Pitts-class aircraft competing in the advanced class.

Giving possibility to use two more figures in Free Known sequence lowers the average K-factor of the figures, and thus helps to create a sequence that can be flown also with a less powerful aircraft. Alteration enables wider range of aircrafts to be used in competitions.

There is not similar problem in glider aerobatics, but to keep the rules consistent the change is also proposed for Part 2.

NP2018-2

RC

**FRANCE PROPOSAL #1**

Document: Section 6 Part 1

Subject: **Signalling Procedures when start in inverted flight****Proposal**

If the first figure in a programme or the first figure after an interruption begins in inverted flight, allow all wing rocks in upright flight, prior to a half roll.

Rule 3.10.2.3 would then be amended as follows (amendment underlined) :

3.10.2.3.If the first figure in a programme or the first figure after an interruption begins in inverted flight, the authorized starting procedure is either:

- a) a half roll prior to the first wing rock, and all wing rocks performed in inverted flight;
- b) a half roll after all wing rocks performed in upright flight;
- c) a vertical line established from flight in a direction parallel to the starting axis, with the exit in inverted flight; in this case the wing rocks may be performed partly or totally on the vertical line, or after levelling-off in inverted flight.

Rationale

Last year, item c) above was added to the authorized starting procedures -- despite the corresponding vertical line being possibly considered before as an “added figure” or a non-authorized “safety / practice manoeuvre”. Approval of the new rule in the 2016 CIVA Plenary may be interpreted as a general opinion within the community that, while signalling procedures must be governed by a clear framework, an aerobatic contest must not turn into a signalling contest.

In this context, we see advantages in authorizing a half roll towards inverted flight after the three wing rocks performed in erect flight. This makes it easier and less tiring for the pilot to achieve planned positioning, speed and altitude prior to starting the sequence: a good move for safety.

NP2018-3

GAC

**GERMANY PROPOSAL #1**

Document: Section 6 Part 3

Subject: **Height Limits****Proposal**

For Programmes G1 through G3 raise the lower height limit from 100 m to 200 m and the upper height limit from 1100 m to 1200 m.

Rationale

The current minimum height of 100 m leaves only a small safety margin in case of unforeseen events. Finishing the sequence at the minimum height, leaves little leeway for a safe approach and landing.

The intention to present spectacular maneuvers at low altitude is no valid reason to introduce risks for pilots and spectators. Programmes G1, G2 and G3 have high K-Factors, so consequently, figures with high K and corresponding height loss must be flown. Pilots cannot expect to have any height or airspeed reserves completing these sequences. Low altitude and low speed are not a good combination for safe flying!

For Programme G4 (Freestyle) the lower limit can stay at 100 m. In Freestyle the pilot may adjust his sequence according to prevailing conditions and plan to finish near the landing area.

NP2018-4

CC

**NORWAY PROPOSAL #1**

Document: Aresti Catalogue

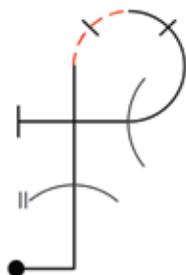
Subject: **Optional Roll elements in P-Loops****Proposal**

In the Aresti Catalogue, Part II – Family 8 Combinations of Lines, Angles and Loops

8.6. “P” Loops

Add an optional vertical roll element and where applicable, an optional horizontal roll element, for 8.6.7.1 through 8.6.24.4

Example:

**Rationale**

Roll elements added to conform to other “P”Loops, 8.6.1.1 through 8.6.8.4. When Norway proposed and CIVA approved 8.6.7.1 through 8.6.24.4 several years back, the optional roll elements were unintentionally omitted. These elements are possible to include when using the Aresti software without any warnings, and have probably been used in sequences previously. “P”loops are very versatile figures, and by adding these optional roll elements, “P”loops with half 8.6.7.1 through 8.6.24.4 can be used as originally intended.

NP2018-5

RC



RUSSIA PROPOSAL #1

Document: Section 6 Part 1

Subject: **Box Marks : Arrow Signs**

Proposal

Return the arrow sign to aerobatic box marks to show into the Official Wind direction.

Rationale

It helps pilot's orientation in the box.

NP2018-6

RC

**UK PROPOSAL #1**

Document: Section 6 Part 1

Subject: **Aircraft restrictions in Intermediate****Proposal**

Proposed language for the rules

4.6. Aircraft Restrictions

4.6.2. Intermediate Contests

4.6.2.1. All aircraft of 260 hp or more are excluded, unless included in the list below.

4.6.2.2. Approved aircraft.

- a) All biplanes with standard engine.
- b) All two-seat aircraft with an engine not exceeding 300 hp.
- c) With standard Lycoming engines:
 - i) Zlin 50L, Zlin 50LA, Zlin 50LS, and Zlin 50LX
 - ii) CAP-231 (unmodified)
 - iii) CAP-21DS (I-SIVM)
- d) With standard M-14P engine (unmodified)
 - i) Yak 52
 - ii) Yak 55, 55M; Technoavia SP-55
 - iii) SP-91/95, I-3

4.6.2.3. A “standard” engine is defined as:

- a) A Lycoming engine not exceeding 300hp
- b) A Vedenyev M-14P engine not exceeding 360hp

4.6.2.4. In the case of experimental or homebuilt aircraft, except Ultimate 10-300S, or modified series production aircraft with 6-cylinder Lycoming engines, the pilot must produce a current year bench test certificate from a reputable engine builder/rebuilder confirming the maximum rated horsepower. The Jury may require aircraft with supercharged engines to be ground run at take-off power to confirm maximum achievable manifold pressure.

4.6.2.5. Initial approval for a new type aircraft, not included in one of the approved categories, to compete in Intermediate competitions may be sought by the CIVA Delegate of the country concerned and granted by CIVA at its plenary meeting.

4.6.2.6. The organizers or the President of the International Jury may recommend to CIVA the exclusion of aircraft types, should they deem it necessary.

Rationale

Introduction

The UK believes, following feedback from various participants in the sport, it worth reviewing and debating the perceived competitiveness of lower performance aircraft in the intermediate class and to improve the accessibility of the sport more widely.

Should it be proposed that performance limitations are placed on aircraft in the Intermediate class? These would use similar rules to those previously applied to the Advanced class, updated to take account of recent aircraft developments.

Background

There is a perception, amongst some pilots, that in order to be competitive at international competitions at any level, you must have the highest performance aircraft. This reduces the pool of people that are financially able to compete, unless they are lucky enough to reside in a country that provides state funding and means that younger competitors are generally less able to compete internationally.

In order to improve accessibility, to perhaps level the playing field, widen the pool of available talent and encourage the development of younger competitors, it can be argued that a limit be placed on aircraft types that are allowed to compete in the Intermediate class. It has been suggested that this might facilitate the continuation, indeed expansion, of this class in the future as well as ensure new talent is brought in to the sport and allowed the opportunity to develop on an international stage.

FPS WG:

- N. Buckenham (Chairman)
- G. Guillemard
- D. Lovell
- V. Machula
- M. Mamistov

RC

JC

GAC

Plenary



CIVA FPS WORKING GROUP PROPOSAL – 2017

The development work discussed here was carried out by the FPS Working Group as a response to French proposal NP #2017 introduced at the CIVA 2016 plenary conference and Matthieu Roulet's paper "[MRoulet Rebalancing CIVA Scoring Method](#)", which together questioned whether a scoring system could be developed so that the competitors scores obtained in a programme would not depend upon the scoring of other competitors.

Summary

Though primarily concerned with the FairPlay statistical system the working group has reviewed many of the simpler methods used by other major sporting regimes such as swimming, gymnastics, high-board diving etc. which deliver fixed or stable individual scores from judges opinions, in case any could simplify or render obsolete the more sophisticated techniques employed by FPS to provide the fairest possible result taking into account all relevant data. In every case however by setting a "fixed" result as the primary criterion the balance and coordination of the underlying judgements are handled with less regard for bias and fairness, and for CIVA the outcome would very likely be unacceptable. Doug Lovell's IAC publication "[Throwing Away High and Low](#)" illustrates many examples from this minefield, though IAC continue with raw averaging at their events.

By contrast a fundamental requirement of FPS methodology is that all stored scoring data within each programme should be assessed every time results are calculated in order to provide a robust, fair and unbiased result, and therefore individual pilot score and rank refinements are inevitable as more data becomes available. It follows that if the existing algorithms can be developed to stabilise these minor variations this would present a more appropriate solution than the prospect of moving to a radically different system offering an inherently inferior level of fairness and accuracy.

FPS developments

Using existing championship contest files we have found that by replacing the abrupt Go/No-Go method of data rejection and substitution of Fitted Values at a specific level of uncertainty by one that provides smooth and proportional data substitution over a range of uncertainty values, a much improved level of stability between successive results calculations can be achieved. Interestingly this new approach more closely mimics the normal human response to matters of judgement in which deliberations move through a gradual transition from sure to unsure.

In the FairPlay process other items that can cause instability between successive calculations are:

- a) The FPS "60% Rule" requires that if more than 60% of all judges' normalised marks for a pilot fail their acceptance test then all must be rejected and replaced by their Fitted Value. This assessment is influenced by all other FPS considerations within each group, and on the margin can occasionally slip from one state to the other. The logic for this item is good, but a better solution that avoids the potential for such step-changes has so far not been found.
- b) When more than 30 pilots have flown a re-calculation is triggered if any scores are below 60% (knowns) or 50% (unknowns), excluding the lower performing pilots to avoid any

influence in the combined results they might have on pilots with scores above these levels. Minor variations in scores close to these trigger points can on occasion change the selection of pilots in the above/below sections, inevitably with some effect on the results.

- o Revising the 30 value to 11 for example would be more logical and also encompass smaller (e.g. glider) events as well as the larger power championships.
- o Discarding this system entirely would be a supportable move as in reality the judges' opinions are influenced by everything they see during each programme and thus arbitrarily excluding some data for some of the time is not logically secure.

Further work to resolve these features will be carried out prior to plenary to provide a recommended solution.

The W/G proposes that the 'proportional' FPS method (PFPS) should be adopted by CIVA for use from 2018 forwards.

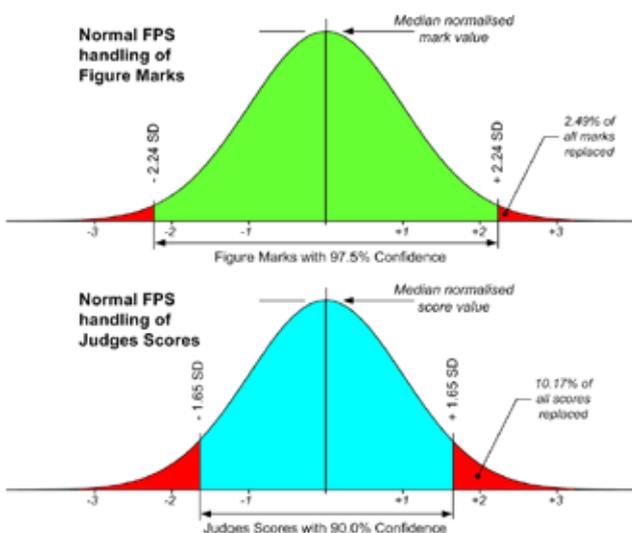
An explanation of the FPS judges mark and score handling process

The judges' marks are initially collated into groups within which the figures have notable similarities so that as far as possible 'like' is compared to 'like' and logical data comparisons can be established.

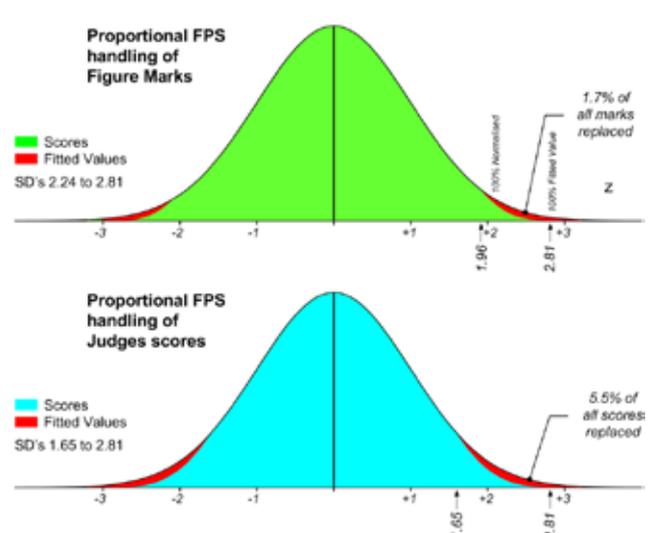
After normalisation within each group to balance the judge styles, each data point is assessed by its Standard Deviation (SD), a customary measure of its "fit" within the group with respect to each pilot and judge. In the existing FPS solution marks with SD greater than 2.24 (97.5% confidence) or scores with SD greater than 1.65 (90.0% confidence) are deemed unacceptable and replaced by a Fitted Value calculated in the judge's style but free of any influence from the rejected grade(s).

In the proportional solution however the move from normalised mark to Fitted Value is made gradually and the output becomes a smooth transition from one to the other. Marks and scores are still subject to careful analysis throughout, but successive results iterations are more stable and variations in pilots' scores and hence rank positions are significantly reduced.

The existing FPS solution

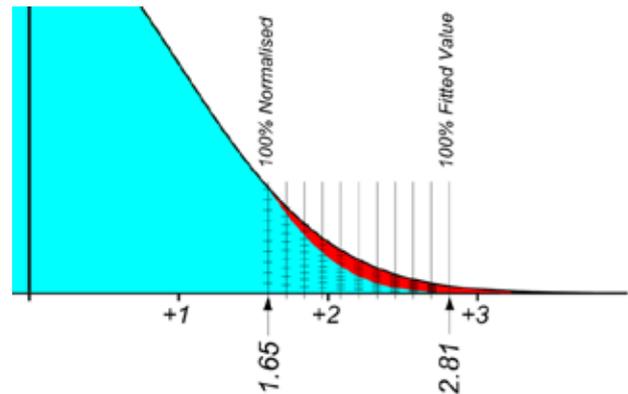


Proportional FPS solution (PFPS)



In the proportional method, from many trials we have settled upon SD ranges –

	<i>SD low</i>	<i>SD high</i>	<i>Confidence %</i>
<i>Figures:</i>	1.96	2.81	95.0 to 99.5
<i>Scores:</i>	1.65	2.81	90.0 to 99.5



Whereas in the current FPS approach some 2.5% of all marks and 10.2% of all scores are rejected and the Fitted Value immediately substituted, in the proportional version with the above SD's just 1.7% of marks and 5.5% of scores transition smoothly from their normalised value to their Fitted Value, and with these settings we have found the influence on results stability at its most effective.

The broadened scope of this method is such that at each successive calculation of the results the additional judging data is unlikely to cause the marks and score SD's to vary significantly from their prior value and thus their influence on score (and hence rank) changes is of reduced concern.

Appendix

On the next pages are some graphic illustrations of the ranking output as produced by a modified version of the ACRO scoring software, using typical data from programmes at recent glider and power championships. They show the variations in scores and hence the rank positions of each flown pilot at each possible stage of the programme, starting with just 3 flights completed (the minimum that FPS can handle) right through to the last. Pilots have been added according to the Flying Order established at the event, so that each one appears in the results in the correct order.

When using any system that reviews the value of all available data every time it is run to create, as far as possible, a balanced and bias-free overall result, it is inevitable that successive re-evaluations of the data as the pool content increases will reach similar but slightly different conclusions. The Working Group is satisfied however that this modified process provides a robust improvement over the existing system, which has remained virtually unchanged since its first use in 2005.

In each case here it is very clear that the use of the proportional FPS method significantly, though not entirely, stabilises the successive rank orders by comparison with the established FPS system, and greatly reduces instances of rank exchanges between pilots with similar scores. It can also be seen that the final scores provided by the proportional system are very similar to those from current FPS methodology.

We have concluded therefore that the proportional FairPlay system described here is likely to provide a marginally more realistic assessment of all the available data, and can therefore be accepted by CIVA as a beneficial change that implies no impropriety toward prior established results.

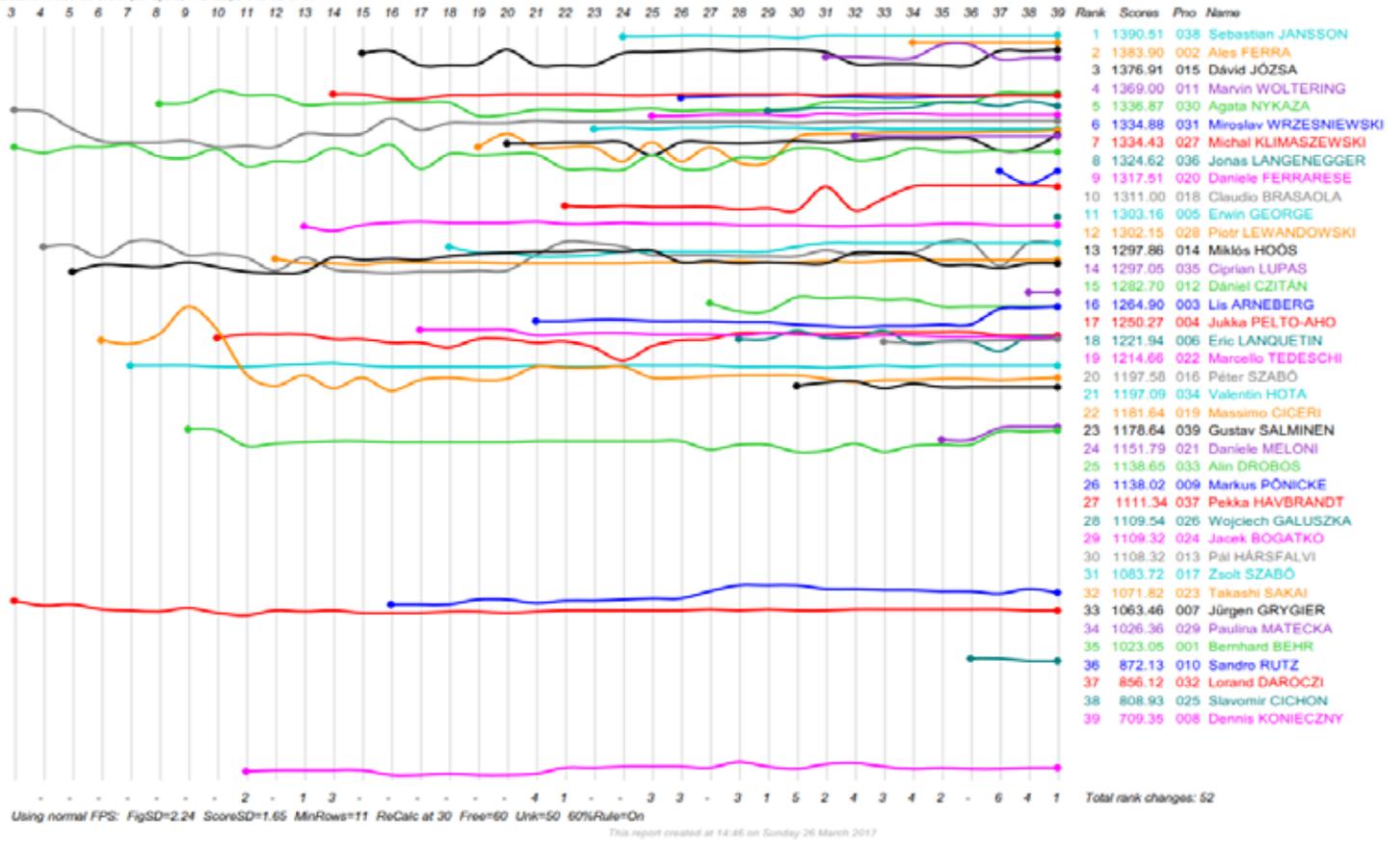
Nick Buckenham
CIVA FPS Working Group chairman

RC Chairman Note: This report requires review by the RC / JC / GAC, with recommendations for amendments if any. A final version will be referred to Plenary by the FPS WG for a vote on adoption.

Progression of Pilot Scores Report: Free Unknown, 7th WAGAC

Data is in scores order per cycle, F/O steps 3 to 39 of 39

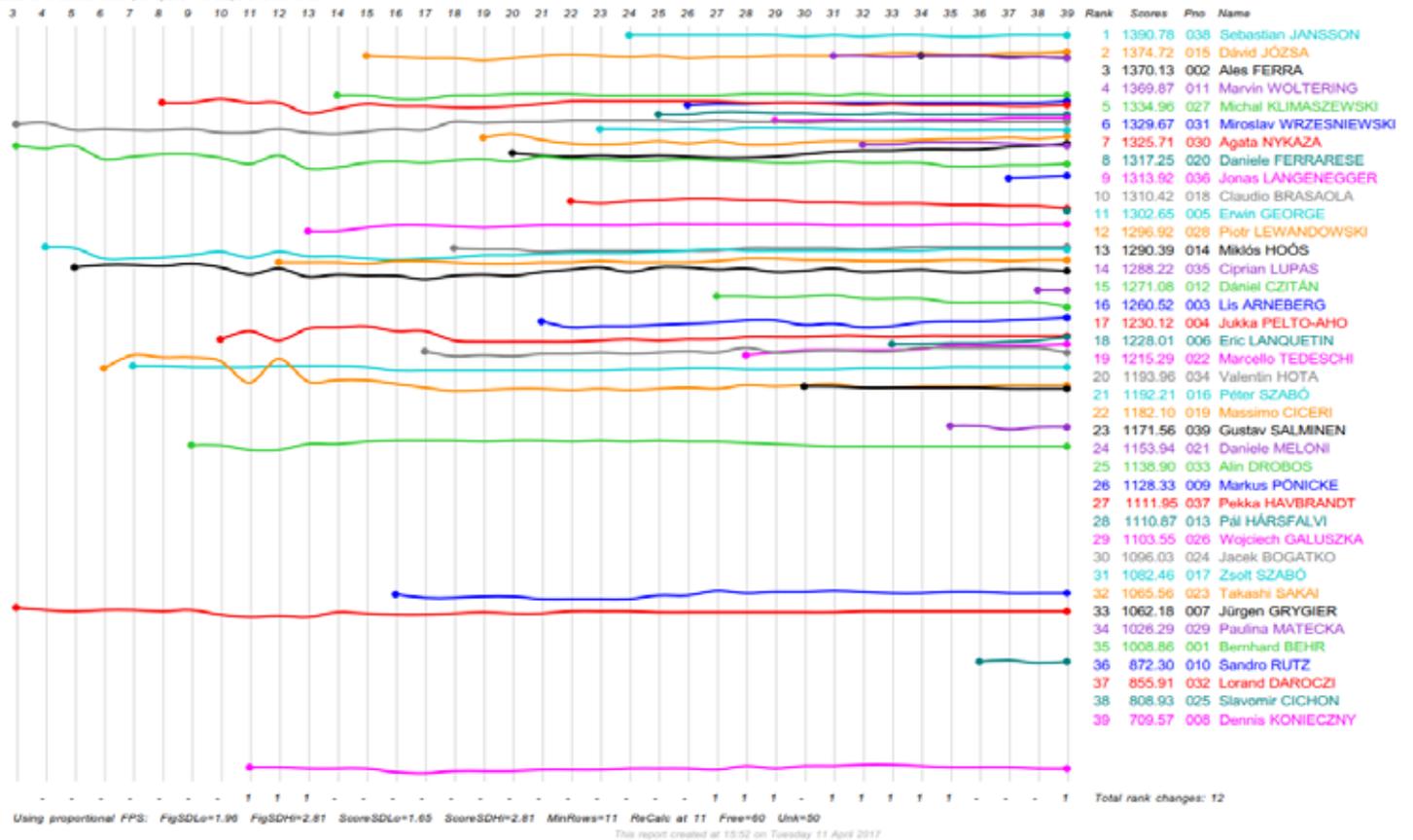
FPS: Normal 2.24 & 1.65, Re-Calc @ 30 per CIVA



Progression of Pilot Scores Report: Free Unknown, 7th WAGAC

Data is in scores order per cycle, F/O steps 3 to 39 of 39

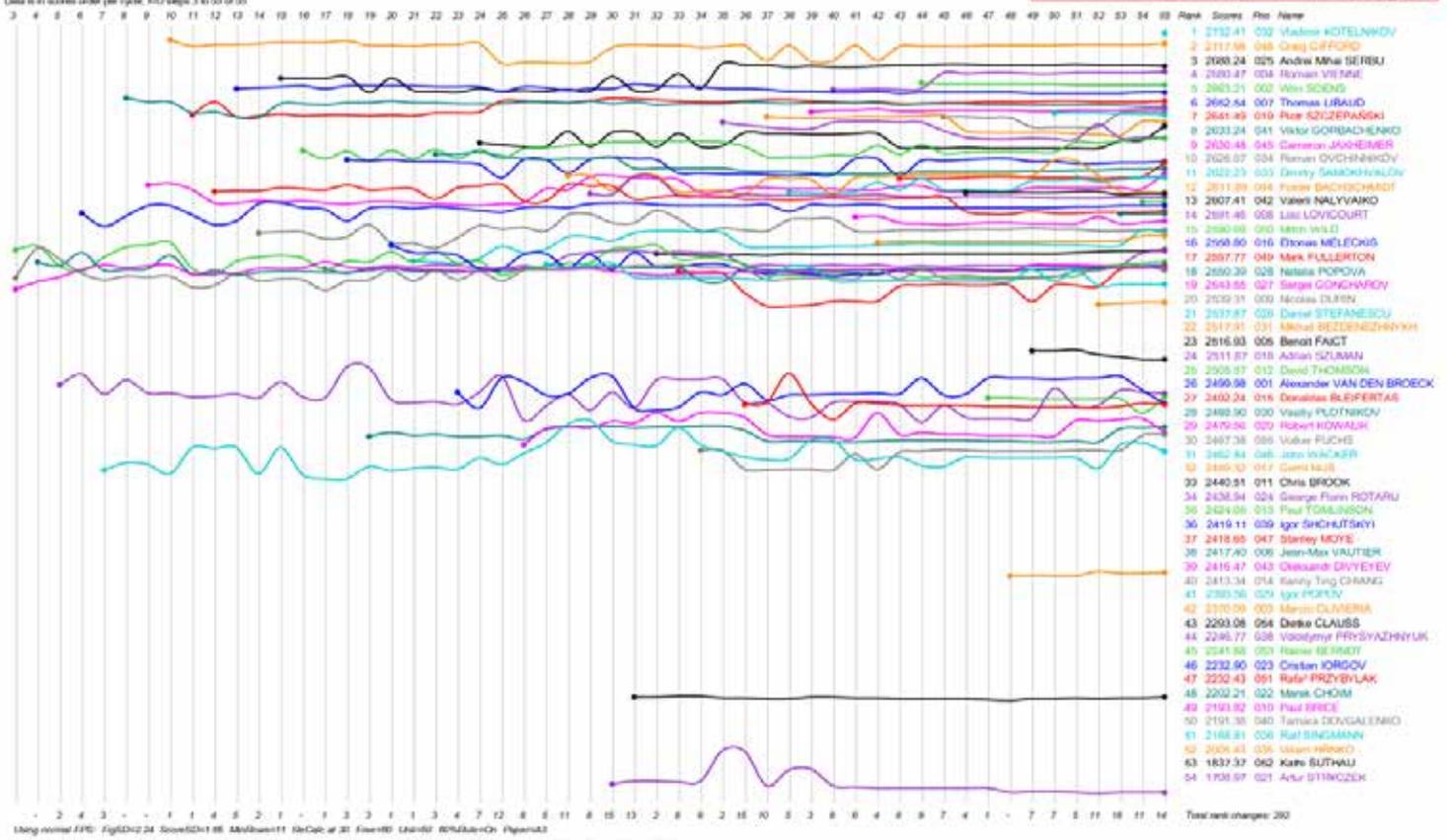
PFPS: Figs 1.96 to 2.81, Scores 1.65 to 2.81, Re-Calc @ 11



Progression of Pilot Scores Report: Programme 1 - Free Known, 12-h FAI WAAC 2016

Data is in scores under per cycle, FID steps 3 to 55 of 55

FPS: Normal 2.24 & 1.65 per CIVA, Re-Calc @ 30



Progression of Pilot Scores Report: Programme 1 - Free Known, 12-h FAI WAAC 2016

Data is in scores under per cycle, FID steps 3 to 55 of 55

PFPS: Figs 1.96 to 2.81, Scores 1.65 to 2.81, Re-Calc @ 11

