AGENDA ITEM 13a

KNOWN/Q ANALYSIS WORKING GROUP REPORTS

Proposed Known Programmes 2012

Alan Cassidy's Analysis

Unlimited Power

Proposal A, 401K
Technically quite testing but no single element that cannot be readily flown in older Unlimited aircraft types. Not requiring any flying at the top of the box in order to preserve height later. No lines especially likely to lead to box excursions.
Very Good

Proposal B, 331K
Not technically demanding at the Unlimited level. Figures 2, 3, 4, 5 8 and 9 are hardly challenging. Downwind line 6 to 7 likely to use more than 1,000m in high wind conditions.
Weak

Proposal C, 411K
High K, although not especially technical in most figures. Relatively simple to keep in the box, but perhaps too much cross-box correction available. Risk of high-speed negative flick overload of aircraft or pilot brain on down line of Figure 9. Undue risk of aircraft or brain damage to less experienced pilots.

Proposal D, 342K
Moderate K with some technicality. Some flexibility in cross-box planning. Long period of level flight needed between figures 2 and 3. Vertical down roll on Figure 8 inappropriate at this stage of sequence and before climbing flick.
Fair

Proposal E, 425K
High K with adequate technical problems. Figure 3 perhaps demanding of performance for older Unlimited aircraft. Opportunity to build energy after the rolling turn, but no flexibility in use of single cross-box corrector.
Good

Proposal F, 399K
Moderate K, not particularly technical. No upward vertical flicks. Straightforward for the box. Some collusion with Proposal G!!

Fair to Good

Proposal G, 374K
Simplified version of Proposal F. Not sufficiently demanding technically. Ok for the box and safety.
Weak

Preference, best to worst: A, E, F, D, B, G, not C.

Advanced Power

Proposal A, 263K
Moderate K, some technical challenges especially. No undue energy issues for lower-powered aircraft. Adequate wind correction and no sill box issues in stronger wind.
Good

Proposal B, 258K
Moderate K, but unbalanced with some simple figures. Good energy management for lower-powered aircraft, but excessive flight on the B Axis.
Fair

Proposal C, 267K
Moderate K, but no opposite or unlinked rolls. Strong risk of box impossibility on windy days and long, plain line between 7 and 8. Figure 8 includes positive flick on negative line at low speed, which is not really part of Advanced repertoire.
Unacceptable

Proposal D, 257K
Moderate/Low K with some technicality. Three figures with height loss and 2 flicks before the spin entry will demand very high starting heights for lower-powered aircraft and give undue advantage to aircraft formerly disallowed at this level.
Unfair

Proposal E, 270K
Acceptable total K, and some technicality. However, upward vertical 3/4 flick is outside Advanced repertoire and a strong deterrent to extended participation by less experienced pilots. Many flicks after spin destroy energy for lower-powered aircraft and then full vertical down roll on Figure 8 risks low flying late in the Programme.
Unacceptable

Proposal F, 262K
Moderate K, without much technicality. Sequence of figures before extended spin at Figure 5 will give undue advantage to higher-powered aircraft. Energy building afterf Figure 6 comes too late.
Weak

Preference, best to worst: A, B, F, D not C or E.

Yak 52

Proposal A, 189K
Moderate to high K. Downwind spin entry is ugly and leads to judging uncertainties, especially in aircraft as Y52 with forward centre of gravity condition. Inclusion of 3/4 vertical upward roll in the second half of the sequence is perhaps too demanding, while inclusion of half outside loop after a downward flick is likely to suffer from insufficient entry speed for the push and potential loss of control issues at low speed at the top of Figure 8.
Weak

Proposal B, 181K
Moderate, reasonable K, with some technicality in 1, 2 4 and 8. Hopefully adequate energy gaining between 5 and 6. Small concern about height loss in final down line after destruction of energy during Figure 8, but this should be acceptable in view of extent of practice flying possible.
Fair

Preference, best to worst: B, A.

Gerard Bichet's Analysis

Advanced Power

Advanced proposal #A

Interesting sequence. No safety concern. The variation over the theme of ¾ flick rolls is an interesting idea… but the ¾ flick roll on a horizontal line is not in the spirit of advanced figures. Thus, this sequence should not be chosen.

Advanced proposal #B

Not very original sequence, but very well balanced. No safety concern. Every figure can be shown without great difficulty. Good sequence.

Advanced proposal #C

Not very interesting sequence. Only 3 flick rolls. No safety concern. Quite easy box.
The positive flick roll on a negative horizontal line (Figure #8), is not in the spirit of advanced figures. Thus, this sequence should not be chosen.

Advanced proposal #D

Interesting sequence, very well balanced and with rhythm. No safety concern. Interesting structure which asks a bit of skill for the box. Good sequence.

Advanced proposal #E

A rather difficult box (because of the 180° rolling turns a bit late in the sequence).
No safety concern.

The positive flick roll on a vertical climbing line (Figure #5), is not in the spirit of advanced figures. Thus, this sequence should not be chosen.

Advanced proposal #F

Only 3 flick rolls. No safety concern. Flying figure #1 respecting the criteria for the loop and trying to fly figure #2 correctly and not too high (not considering the maximum height for the sequences, but only the visibility of the figure, and the comfort fort judges) asks a lot of energy and a big engine. Same difficulty for figure # 8 and figure #9. It is a bit disappointing to fly figure #9 after figure #8, because the 8 point rolls will be flown rather high and not very visible from judges line. Of course, with a powerful engine, it is possible to enhance the radius of the loop of figure 8, in order not to climb between both figures.

The sequence could be a very correct sequence with a big engine, but it is rather unfair for pilots with more modest aircraft, and not in the spirit of advanced category.

Preference order : D, then B and F.
NOT A, C, E

Mikhail Mamistov's and Anatoly Belov's Analysis

Unlimited Power

A
In case of tailwind there will be "outs" on figures 4 and 5

B
Guaranteed "out" due to two downwind 45 degrees lines one after another on figures 6 and 7. Total K-factor is too low for the Unlimited

C
High speed negative snap on figure 9, there can be a problem for pilot's health.

D
Crossbox frase (fig. 4 – 5 – 6) in case of a strong crossbox wind either do not allow good positioning correction or may force a pilot to get behind the Judges heads. Empty vertical lines on figures 6 and 7.

E
Good sequence, includes better variety of figures.

F
Good sequence.

G
Good sequence.

H
Figure 2 demands lots of speed and to get it half a snap on figure 1 has to be performed at a high speed. It may be not safe for some airplanes which have snap speed limit (CAP). Crossbox figures 5 – 6 do not allow positioning correction on Y axis in case of strong crossbox wind.

Order of preference: E,F,G,C,D,A,B,H

Mikhail Mamistov's and Anatoly Belov's Analysis (continued)

Advanced Power

A
Good sequence

B
Figures 3 and 7 are not up to the Advanced level (too easy)
Crossbox frase (fig. 4 – 5 – 6) in case of a strong crossbox wind either do not allow good positioning correction or may force a pilot to get behind the Judges heads.

C
Too many downwind figures one after another (fig, 4 – 5 – 6 – 7)

D
Crossbox frase (fig. 4 – 5 – 6) in case of a strong crossbox wind either do not allow good positioning correction or may force a pilot to get behind the Judges heads.

E
Good sequence

F
Airplanes with better power to weight ratio will have an advantage on figures 1 and 2
Too much inverted flying.

Order of preference: A,E,C,D,B,F

Yak-52

A
Not enough speed for figure 5 after figure 4 for Yak-52s.
Figures 7 and 8 are not for Yak-52s.

B
Good sequence, no problem.

Order of preference: ONLY B

Matthieu Roulet's and Coco Bessiere's Analysis

Unlimited Power

(note: scale: --, -, 0, +, ++; safety below 0 seen as no-go)

- Proposal A: Technical and challenging sequence, Box OK. But concern over Fig 8: The negative half flick involves pushing towards the ground, and have it followed by a long aileron rotation may pose some safety concerns to some pilots.
=> Safety 0
Interest ++
Box ++

- Proposal B: Fig.3 and 9 not very interesting. Lots of problems with the box (e.g. stall turn downside of the box, Fig.6 + 7 involving two 45deg lines combined downwind). Fig 6 may pose some safety concerns to some pilots (potential lack of height to perform the vertical downline).
=> Safety 0
Interest -
Box --

- Proposal C: Sequence too challenging; 3 flicks in the same Fig (Fig.9) is too much. Plus there is no spin in this sequence. Box OK. There is a very significant safety concern at the end of the sequence: Fig.7 can only degrade available energy, Fig. 8 can only end lower, while Fig.9 (with a vertical flick downgrading again energy) then ends with two flicks in a row on the 45deg downline: Serious risk for some aircraft integrity and serious risk for end of program height.
=> Safety - -
Interest -
Box ++

- Proposal D: Interesting sequence, challenging enough to make sure pilots get sufficient training before taking part to an Unlimited contest. Height & safety OK. Smooth box.
=> Safety ++
Interest ++
Box ++

- Proposal E: Sequence too challenging -- way too selective for many pilots. Judging issues on Fig.9 to be expected (positive vs negative airflow prior to flick). Box OK. Fig.9 has the potential to induce safety concerns to some pilots (experience shows that even proficient pilots may display very significant altitude variations in those long opposite aileron rolls; such a design at the end of the sequence at low altitude may prove problematic).
=> Safety 0
Interest -
Box ++

- Proposal F: No spin in this sequence. Box OK. There is a significant height risk at the end of the sequence: Fig.7 can only degrade available energy, Fig. 8 can only end lower; putting then a tailslide, at the very end of this sequence and after such figures, may prove problematic.
=> Safety -
Interest 0
Box ++

- Proposal G: No spin in this sequence. Box OK. There is a still a height risk at the end of the sequence despite the improvement in aileron roll in Fig.8 compared to proposal F: Fig.7 can only degrade available energy, Fig. 8 can only end a bit lower; putting then a tailslide, at the very end of this sequence and after such figures, might prove problematic.
=> Safety 0
Interest 0
Box ++

- Proposal H: Sequence too challenging, at least for some of the Unlimited aircraft (Fig. 1 + Fig.2 sequence, requiring limited velocity for the Fig.1 flick, only to then require significant velocity to engage properly into Fig.2). Box OK. There is always in our opinion a safety issue when we see a spin (a long one at that) so late in a sequence, where altitude before the spin cannot be guaranteed and when accumulated fatigue can play a role (even more in this configuration with a G-Lock risk in the subsequent pull).
=> Safety -
Interest -
Box ++

Order of preference: D - A - G - E
Recommendation: Discard B , C , F and H

Coco Bessiere's Analysis

Advanced Power

- Proposal A: Only 3 flicks (maybe not enough). The 3/4 flick in Fig.8 shall not be found at Advanced level -- too difficult.

- Proposal B: Good sequence, well balanced technically, classical construction allowing a compact box, no safety concern.

- Proposal C: Only 3 flicks (maybe not enough). The flick in Fig.8 shall not be found at Advanced level -- too difficult.

- Proposal D: Good sequence, well balanced technically, no safety concern.

- Proposal E: The 3/4 flick in Fig.5 shall not be found at Advanced level. The same holds true for the opposite aileron roll combination in Fig.9.

- Proposal F: Only 3 flicks (maybe not enough). The flick in Fig.2 shall not be found at Advanced level. Fig.4 may not be feasible for all types of aircraft to be expected at Advanced level (reminder: when the decision was taken to remove aircraft eligibility criteria, it was agreed that attention would be paid to sequence design to make sure that previously eligible aircraft were still well positioned to compete. Proposal F does not comply to this principle). The spin (a long one at that) comes too late in the sequence, inducing safety concerns.

Order of preference: B - D
Recommendation: Discard A, C, E and F

John Morrissey's Analysis

Unlimited Power

A Okay with some concern (inadvertent tumble/low altitude for recovery) on # 8, the ½ outside flick from positive aoa on a 45 down line at the bottom of box.

B Perhaps, but maneuvers 3 and 9 seem more appropriate for Advanced. Additionally, in a maximum CIVA X axis wind, the downwind cross box combination will not fit the box following the drift in figure 3. Figure 6 will also have difficult in the same wind as it contains two 45 lines preceded by a maneuver with two 45 lines.

C No. Too ambitious for all but potential world champions. The big problem is the lack of energy in the last two figures at minimum altitude with a double/opposite/inside/outside snap to negotiate. And 9 snaps?? + Three snaps in one figure???

D Okay. However, some concern with 1 & ½ outside flick on maneuver 1. Speed control on the line before snap is needs to be handled carefully. If speed is too high there is potential for structural as well as physical issues.

E Okay. But are 8 snaps necessary?

F No. I can see energy and altitude issues at the end with a tail slide from the bottom of box.

G No. While essentially the same as proposal F, I think energy control at the end is slightly better and the double snap on maneuver two is an improvement; however, a tail slide gone wrong at the bottom of box must be considered. A good sequence if 9 were different.

H No, for two reasons. The energy for the opposite ¼ aileron/¾ snap roll combination on the 45 up line in #2 is not compatible with the low energy exiting #1 due to the half flick at the end of that maneuver. And the spin (a 1 & ¾ variant) with pause prior to ¼ roll comes too late in the sequence.

Recommend F, H, C, & B not be considered

Order of Preference: D, A, E

John Morrissey's Analysis (continued)

Advanced Power

A Okay

B No. IAC rule 5.3.1 requires all Known compulsory programs begin into the wind. Proposal B has a downwind entry. This serves to illuminate the difficulty I have making a recommendation from the CIVA proposals as the IAC uses the CIVA Advanced (and Unlimited) choices for their/our known compulsories. There are many countries that have their own rules that permit such things as downwind entries. Proposal B is perfectly acceptable except for the IAC/CIVA issue previously mentioned. There are other issues that need to be resolved between our two rules committees as well. See comment on proposal E.

C No. Will not fit the box in CIVA (or IAC) X axis maximum allowable wind.

D Okay.

E No. Vertical ascending snaps not used in IAC Advanced Known or Unknown compulsories – again, refer to my previous comment regarding CIVA/IAC compatibility challenges.

F No. Energy issues with both maneuvers 8 & 9 ascending.

My choice: D, A

Martin Vecko's Analysis

Advanced Power

No safety concern in any of the proposed sequences.

A: An interesting, quite well balanced sequence. 3 flick rolls (¾ in fig. 8 not used in advanced). Simple and good cross-wind correction.

B: 4 flick rolls, more complex cross-wind correction with longer cross-wind line (fig. 4 and 5)

C: 3 flick rolls, just one figure with higher negative G (fig. 8), simple cross-wind correction. Rather simple construction.

D: 4 flick rolls, more complex cross-wind correction.

E: 4 flick rolls (one on vertical line up not used in advanced), weaker cross-wind correction (rolling turn, later in sequence)

F: 3 flick rolls (360 deg rotation on line down not used in advanced), more complex cross-wind correction

My preference :

High : A (may be with a change of ¾ flick roll), B, D
Low : C, E, F