AGENDA ITEM 14a

KNOWN/Q ANALYSIS WORKING GROUP REPORTS

Proposed Known Programmes 2013

CIVA Known/Q Analysis Working Groups were formed several years ago to provide Delegates with expert advice on the quality, safety, and flyability of Known sequences submitted to CIVA for consideration. The Working Groups are made up of experienced pilots and coaches who have proven themselves in competition and sometimes have gone on to successful coaching careers as well. They have all flown a wide variety of aircraft.

Deadline for submission of Known sequences for Power was 1 October 2012. Seven Advanced, nine Unlimited, and two Yak-52 sequences were proposed. Immediately after the deadline closed, the sequences were all checked, re-drawn, and de-identified by Brian Howard (USA). The Agenda Package was then prepared, posted on the CIVA website, and sent to all of the analysts. They were to report back by 20 October 2012.

My thanks to all of them for their contributions. New to the Working Groups in 2012 were Patrick Paris and Jeff Boerboon. The analyses were provided in different formats this year but clearly the table format is preferable and should the way of the future.

To help Delegates study the sequences and decide on which ones they will vote for, tables are provided at the end of this document with the sequence ratings tabulated therein. I encourage you to read through the comments and then review the table at the end for an easy-to-read summary.

Mike Heuer
President of CIVA

Alan Cassidy's Analysis

Advanced Programme Q/Known

Principles

With the deletion of aircraft restrictions at Advanced, it is very important to choose a Q/Known Programme that is equally flyable by traditional Advanced aircraft. CIVA should not choose a sequence that inherently gives a greater advantage to higher-powered aircraft.

It is acceptable to have figures in a Known Programme that are ineligible for the Unknowns, as long as the reason for exclusion from Unknowns is not performance-related.

	Comments	Score	Rank
A	All figures acceptable. No safety hazards. Sufficiently technical to differentiate pilots, but not to deter newcomers. Energy building in Figures 4-6 enables even lower performance aircraft to start the sequence lower and gain height for the spin. Rolling turn is only cross-box correction.	9/10	1
B	Third line of Figure 1 requires a long line after the flick roll, but this then means that the line before the descending half roll must also be long, leading to risk of overspeed during flick roll. Figures 4 and 5 involve significant height loss after the spin has already been flown. This sequence is potentially dangerous at Fig 1 and gives great advantage to high-power aircraft.	3	4
C	Downwind flight during Figures 1 and 2 need reduced speed which is not then appropriate for Figure 3. Level spin entry after half loop up is very poor energy management. Inverted exit to Figure 8 after 3/4 roll down will lead to high negative G and high entry speed for second rolling turn in the Programme. Otherwise perhaps too simple and low K.	0	not ranked
D	Figure 1 require performance significantly higher than vested in Unknown figures. Figure 2 also requires high entry speed which promotes half flick on Fig 1 and excessive speed to balance lines. Un-necessary height loss after 1 and 3/4 spin to gain speed for following loop and flick. Sequence presents excessive advantage to high performance aircraft.	2	5
E	Excessive use of B Axis 3 times before Fig 6. Acceptable for lower powered aircraft. Moderate technicality.	7	2
F	Figures 1 and 3 require excess performance over standards assumed for Unknowns, the latter after a descending flick roll. B-axis loop/flick segment in Figure 4 un-judgeable centre box. Acceleration required between 5 and 6 inappropriate for lower performance aircraft.	4	3

G	Figure 1 flick is inappropriate for lower performance aircraft when coupled with half loop to 45 down. Acceleration required between Figs 3 and 4 is too great an advantage to high-powered aircraft. Transition from Figure 6 to Figure 7 completely unfeasible in anything other than 6-cylinder carbon monoplane.	0	not ranked

Unlimited Programme Q/Known

Principles

The Unlimited category is suffering a decline in the numbers of competitors. In 2012 this was exacerbated by the choice of a sequence containing two high-speed negative flick rolls. The Programme chosen by CIVA should not deter new pilots from moving up to Unlimited, not should it carry risks to health as it will necessarily be flown many times in training.

It is acceptable to have figures in a Known Programme that are ineligible for the Unknowns, as long as the reason for exclusion from Unknowns is not safety-related.

	Comments	Score	Rank
A	Safe, medium complexity, limited cross-box correction at Figure 4, so a bit challenging in a cross wind.Technical combinations in 3, 7 and 8, but relatively kind to mental health.	7/10	1
B	Fig 3 will need high speed half negative flick due to following elements. Double roll down on 7 means more height loss to no real benefit in testing pilot skill. Line needed after double-flick down on 7 also means line before, so this is also a high-speed flick in this sequence. Low speed wrong-line flick on 9 will cause judging disagreements. Cross box correction in 4 and again in 6. Energy and box relatively easy.	5.5	3
C	Figure 1 demands very high G loading on first corner, but proves nothing about skill level of pilot. Excessive cross box corrections in 4, 5 and 7 means that optimal positioning will be rare. Total of 5 vertical down flicks will lead to excessive height loss.3 and 9 rather simpla.	4	7
D	Downwind line from 3 to 4 will be very long in stronger winds. Centre box figures on 3 occasions will stretch sequence out and make optimal placement impossible. Vertical 1 and 3/4 roll on 7 is a big disadvantage for the slower-rolling aircraft. Cross box correction rather late at Figure 6/7. Low K, probably too simple for WAC.	5	4
E	Link between Figures 1 and 2 will require flick at high speed after 7/8ths loop down in order to make 3x4 and control slide. Risk of overstress for wooden wings when first flown and big advantage to	0	not ranked

	more powerful aircraft. Very spread out from downwind extreme of Fig 3 to upwind extreme of Fig 6. Very bad for box in light wind conditions.		
F	Vertical 1 and 3/4 on Fig 1 favours performance aircraft, as does last corner of Fig 2. Deterrents for competitors with slightly less powerful aircraft. Cross-box down 45 on Fig 4 not really judgeable. 3/4 vertical snap on Fig 7 ends with a lot of opposing rudder if flick done properly. This makes slide very unreliable. This figure will encourage modification of flick rolls with primarily increased aileron and reduced rudder inputs. This is detrimental to judging and the sport. Shame we won't see the one-roll circle. Very high K will put off newcomers to Unlimited.	4	7
G	Tricky flick on Figure 1 will be flown with aileron by a lot of pilots, rather than being driven by rudder throughout. Judging of opposing low-speed flicks on Fig 7 will cause variable judging results. Interesting to see how pilots cope with cross box on 4 and 5.	6.5	2
H	Figs 2, 3 and 6 rather un-demanding. Low overall K as a result. Very high speed negative flick needed on Figure 5. Cross box elements of 4 into 5 will lead to excessive crosswind correction or the need to go in both directions. Not really a good solution to the wind issue.	4.5	5
I	Maintaining speed for flick on Figure 4 will mean large height loss after slide on Figure 3. Building speed for 7 in light wind will go out of box for all but most powerful aircraft. Rather mad to put two roll circle, which requires slow airspeed after a double flick on 45 down!!	4.5	5

Yak 52

	Comments	Score	Rank
A	High entry speed to Figures 2, 4 and 5 before spin involve excessive energy loss. Full flick on Fig 7 not appropriate.		
B	Downwind spin entry aesthetically displeasing!		

Gerard Bichet's Analysis

Advanced Programme Q/Known

	Comments	Score	Rank
A	Only 3 flick rolls. Technically not enough challenging; No safety problem. On the contrary, sequence 4-5-6 can lead pilots to fly too high and get less visible and in the three final figures.	5/10	3
B	Figure 1 is dangerous for low performance aircraft (high speed flick roll). Significant height loss, which over advantages high performance aircraft.	0	Not ranked
C	Only 3 flick rolls. Technically not enough challenging; Sequence 3 - 4 not ideal as far as the energy management is concerned. Negative exit for figure 8 can lead to high G. The high speed outward rolling turn which follows can lead to freightening flights if the pilot tries to reduce the radius of turn in order not to infringe the limits of the box (which can lead to very dangerous high-speed flick roll…) or doesn't manage to maintain his altitude, for instance, pulling too early in the beginning of the roll.	0	Not ranked
D	Very interesting sequence. Figure 1 is adequate even for low performance aircraft because the pilot can begin at high speed without difficulty. Can be transformed in a 2/4 on 45° line if estimated necessary. No safety problem. Well-balanced sequence. Challenging structure as far as positioning is concerned.	9/10	1
E	No safety problem. A bit tricky as far as positioning is concerned (A lot of B axis, in the lower part of figure 1, in figure 2 - 3, and 5.). At least one part of the sequence will inevitably be flown far from the judges.	7/10	2
F	5 flick rolls. Very challenging sequence as far as the probably too high K, as well as its very tricky structure are concerned. Figure 1 is rather difficult to fly for lower performance aircrafts, and loses probably too much energy. Figures 4 and 7 : very long rolls which imply that the 4-5-6-7 sequence would be extremely difficult to position correctly in the boxfor an aircraft with a low rate of roll. This would be far less difficult (even if not really easy) with a high rate of roll. 5-6 sequence difficult for lower performance aircrafts Safety : possible G-lock in figure 4.	2/10	4
G	Three flick rolls. Figure 1 flick is inappropriate for lower performance aircraft when coupled with half loop to 45 down : great loss of energy and VNE	0	not ranked

	far exceeded at the end… Figures 7 and 9 not feasible with lower performance aircrafts. Sequence 6-7-8 difficult to fly while remaining in the box.		

Mikhail Mamistov's Analysis

Advanced Programme Q/Known

	Comments	Score (0-10)	Rank
A	Good enough sequence. No problem with safety.	8	2
B	Normal sequence but underpowered and not unlimited category airplanes for which these competitions were created will be in disadvantage because there is no opportunity to compensate altitude loss, no figures to gain height.	3	5
C	Bad sequence. 1. Bad combination of fig. 1 and 2 downwind, high probability of an OUT. 2. Bad speed connection of fig. 3 and 4. 3. Bad cross-box combination of fig. 5 and 6, no opportunity for a pilot to make positioning correction in a strong crosswind. 4. The main thing is - !!! Safety – fig.9 at a high speed starts with an altitude loss which is not safe at the low box boundary.	0	---
D	Normal sequence but a spin (fig.6) will always start with downwind rudder movement which forces a pilot to make not a nice figure in a strong wind. Pilots who will be lucky to fly in a low wind conditions will be in much more favourable situation than the ones flying in a strong wind.	6	3
E	Good sequence.	9	1
F	Normal complicated enough sequence but not comfortable cross box wind correction (fig. 4-5-6). Pilots who will be lucky to fly in a low crosswind conditions will have an advantage over the ones flying in a strong crosswind.	5	4
G	Interesting enough sequence but not unlimited category airplanes for which these competitions were created will be in a very big disadvantage. Connection of Fig. 6 and-7 is not acceptable in sense of speed management for underpowered airplanes.	0	--

Unlimited Programme Q/Known

	Comments	Score (0-10)	Rank
A	Normal sequence but there is no cross box wind correction (fig. 4 can not be counted in a strong wind). Pilots who will be lucky to fly in a low crosswind conditions will have an advantage over the ones flying in a strong crosswind.	7	3
B	Very good sequence.	9	1
C	Good sequence.	8	2
D	Not enough speed for fig. 2 if fig.1 is flown properly. Bad positioning, very high probability of OUTs on fig. 4, 6, 9.	2	8
E	Not enough speed for fig. 2.	1	9
F	Not enough speed after the snap roll at such an attitude to level off to horizontal flight.	4	5
G	Not enough speed for fig. 8. Not comfortable cross wind correction (fig. 4-5-6). Pilots who will be lucky to fly in a low crosswind conditions will have an advantage over the ones flying in a strong crosswind.	2	6
H	Bad speed connection for fig. 3 and 4.	5	4
I	Very probable OUT on fig.2. Not enough speed for a ¾ negative snap on fig.4. Bad speed connection for fig. 6-7.	2	7

Yak 52

	Comments	Score (0-10)	Rank
A	Speed connection between fig. 7 and 8 is not the best. Sequence is not the best but acceptable for Yak 52.	6	1
B	Fig. 7 and 8 are not for Yak 52.	1	--

Matthieu Roulet's and Coco Bessiere's Analysis

Note: Sequences are evaluated under two aspects:

1. Safety (height issues, G-Loc risk, figure velocities, physiological overstress in repeated training,…). A sequence considered unsafe will be scored 0 and will not be ranked.

2. Fairness & Interest (equivalent flyability by various aircraft types, sensitivity to wind conditions, variety, difficulty,…).

Advanced Programme Q/Known

	Comments	Score	Rank
A	Safety: OK. Fairness & Interest: OK, however fig.6 gives opportunity for high-power aircraft to perform an easier and 'better-looking' figure (greater radius => 45deg line easier to manage).	7/10	4
B	Safety: Unacceptable: Fig.1 with flick following half roll on 45deg down line is considered a severe hazard for lower performance aircraft. Fairness & Interest: Unacceptably unfair. This sequence favours "non-flick-speed-limited" aircraft (fig.1), as well as high-power aircraft (fig.1 and overall energy management). In addition the sequence is too sensitive to wind conditions: 6-7-8 combination gives high risk of box-out depending on wind conditions (stall turn then two 45° lines downwind); stall turn in fig.6 gives advantage or disadvantage depending on wind conditions (turn towards wind easy or difficult depending on aircraft type and needed cross-box correction); in strong wind, fig.3 cannot be centered or strong risk of box-out in fig.4.	0	Not ranked
C	Safety: Unacceptable: Fig.8 with push to exit from vertical down after ¾, at this position in the sequence, is considered a severe hazard. Fairness & Interest: Sensitive to wind conditions: Long line between 3-4 and/or 4-5 in case of strong wind; risk of box-out in fig.7.	0	Not ranked
D	Safety: OK. Fairness & Interest: Well balanced, interesting sequence.	8/10	1
E	Safety: OK. Fairness & Interest: Well balanced.	8/10	3
F	Safety: OK. Fairness & Interest: Well balanced.	8/10	2

G	Safety: Unacceptable. Fig.9 (end of sequence) not feasible in safe condition for 'normal' aircraft, considering the roll on third line => Height hazard. Fairness & Interest: Interesting individual figures, but unacceptably unfair. 6-7 combination favouring high-power aircraft.	0	Not ranked

Unlimited Programme Q/Known

	Comments	Score	Rank
A	Safety: OK, however high speed inverted start with high negative G loading on the push to vertical (fig.1), repeated over and over during the training season, is considered unnecessarily physiologically demanding. Fairness & Interest: OK, however fig.3 would favour pilots used to performing positive flicks to the left in a Sukhoi aircraft for instance (stall turn to the right = better for rudder position after flick, and stall turn into wind)	4/10	5
B	Safety: OK, however 5-6-7 combination requires careful height management. Fairness & Interest: OK, interesting sequence (note: positive flicks in fig.5 and 7 are not optimally placed: downwind => might give impression of varying slope in case of strong wind)	7/10	3
C	Safety: OK. Fairness & Interest: OK, rather interesting sequence, except fig.9 uninteresting.	7/10	2
D	Safety: Unacceptable. Vertical down one-and-a-half negative flick with push to exit in fig.7 considered a severe hazard for pilots without extensive experience. In addition, unnecessarily high-negative-G demanding. Fairness & Interest: Individual figures rather interesting, but: 3-4 combination gives high risk of box-out depending on wind conditions (two 45° lines downwind); same for 4-5-6 combination (two 45° lines "headwind" plus push to vertical and tail slide…)	0	Not ranked
E	Safety: OK. Fairness & Interest: 1-2 combination favouring high-power,"non-flick-speed-limited" aircraft: Unacceptably unfair. In addition, 3-4-5-6 combination gives high risk of box-out depending on wind conditions.	4/10	6
F	Safety: OK. Fairness & Interest: Unacceptably unfair. This sequence favours "non-flick-speed-limited" aircraft (e.g. fig.2) and/or high-power –	4/10	8

	in particular fig.8 (following 5-6-7 combination with no real possibility to gain energy) cannot possibly be flown properly (negative flick on top) on any aircraft except the most powerful ones. In addition, this fig.8 configuration, requiring a small-radius ¾ loop, does not end up with sufficient velocity to allow proper execution of fig.9 unless again with a high-power aircraft.		
G	Safety: OK. Fairness & Interest: Well balanced.	8/10	1
H	Safety: OK. Fairness & Interest: Not such an interesting sequence, with some figures lacking challenges/interest (e.g. fig.2 with 'empty' vertical up ; fig.3).	6/10	4
I	Safety: OK. Fairness & Interest: Unacceptably unfair. This sequence favours high-power aircraft – in particular fig.4 cannot be flown properly (negative flick and balanced line) on any aircraft except the most powerful ones. 6-7 combination also high-power biased. In addition, stall turn in fig.4 gives advantage or disadvantage depending on wind conditions (turn towards wind easy or difficult depending on aircraft type and needed cross-box correction).	4/10	7

John Morrissey's Analysis

My observations on this year's Unlimited and Advanced proposals are included last under. You should know that my evaluation of the sequences may be from a slightly different perspective than yours and this may lead to different observations and preferences.

If I were evaluating the proposals for only the class of competitors, and their aircraft, that have successfully passed through the selection qualifications of our respective countries then most, if not all, of the proposals would be safe and provide a good test for the competitors.

That having been said, CIVA's choice of Q sequences also provides the entry level sequences for many entry level competitors in the IAC. As I am also on that sequence selection committee I feel I must make allowances for those entering the higher categories who in many cases have not had the experience or training for the more complex and energy intensive sequences required of a World Champion. And they may not have access to a world class aircraft either.

So with that caveat in mind, my evaluation:

ADVANCED in order of preference

B. Okay

E. Acceptable, but with possible 'G' issues on #1

A. No. Spin followed by ½ roll down causing altitude problems too late in sequence or causing # 1 through #6 to be too high in box.

C. No.

D. No. Energy for # 1 not available for many Advanced aircraft. Too much cross box activity for good judging. Spin late in sequence. This would make a good unknown sequence, but not a Q.

F. No. Not enough energy for # 6 following a 'roller' on many Advanced aircraft. # 1 will lose ~ 400' and eventually put the spin too late in sequence.

G. No. Altitude loss on # 1. Not enough energy for ¾ roll up on 7 after low energy on departure from 6. Spin too late in sequence after large altitude loss on 1.

UNLIMITED in order of preference

H. Okay

D. Okay

A. Acceptable, but too many one quarter/opposite one quarter turn variants.

C. Acceptable, but, and this is just a personal preference, two snaps per maneuver (#5) is one too many.

G. Acceptable, but again – two snaps per maneuver on # 7.

F. No. Downwind cross box combo (4/5) will not fit box in maximum CIVA X-axis wind. Time from 5 to 6 will be excessive in same wind.

E. No. Speed for snap on # 1 will be too high.

B. No. Energy required for # 1 not available in some aircraft; Too long inverted 'cross-country' flight from 4 to 5 in maximum CIVA X-axis wind.

I. No. I do not support placing a 'triple axel' in first maneuver. Too much time for good presentation between 3 & 4 in maximum X-axis wind. # 5 too energy intensive for some aircraft. #6 two snaps on same line.

Martin Vecko's Analysis

Advanced Program Q/Known

A. Only 3 flick rolls, wind correction by rolling turn only, altitude consuming fig.7 at the end of the sequence could be a safety concern – my preference ***Medium***

B. Balanced sequence, good crosswind correction, some advantage for high performance aircraft – my preference ***High***

C. Unbalanced sequence with low K, only 3 flick rolls, 2 rolling turns, long downwind line in fig. 1, 2, 3 – my preference ***Low***

D. Rather complicated crosswind correction and a lot of cross-box flying – my preference **Medium**

E. A balanced sequence, my preference – ***High***

F. Unlimited style sequence with high K, 5 flick rolls, significant advantage for high powered aircraft – my preference ***Low***

G. Only 3 flick rolls, weak crosswind correction , advantage for high powered aircraft – my preference ***Medium***

My overall ranking (first best): **E, B, A, D, G, F, C**

YAK 52

(I have no personal experience with YAK 52, anyway ..)

A. No negative g figure, spin rather late in the sequence – my preference ***Medium***

B. Balanced sequence, good positioning of the spin in the sequence – my preference ***High***

My overall ranking (first best): **B, A**

Patrick Paris' Analysis

Advanced Programme Q/Known

Proposal A

Negative spin a bit low even with the previous figures, depending on plane's performances

RANKING 2

Proposal B

Figure one first corner: if the pilot wants to show a visible corner, means not a stall, he will be too speedy with a plane having not too much drag for the Full flick after the half roll

NOT RANKED

Proposal C

Rolling turns too low

NOT RANKED

Proposal D

Requires speed for Figure 2 means long line after Half flick in figure one so for sure not balanced, means advantage of high perfo aircraft

Loss of energy in 6 during the spin and need of rather high energy for the top of figure 6

RANKING 4

Proposal E

Looks good

RANKING 1

Proposal F

Requires speed for figure 6, not easy with low performance's plane

RANKING 3

Proposal G

Too hard in figure 7 to have enough speed after figure 6

NOT RANKED

Unlimited Programme Q/Known

Proposal A

Quite heavy push to start, and some high negative G's in Figure 7 and 8
RANKING 2

Proposal B

Good program, Pilots will need to start figure 3 at rather slow speed to have short line before and after the half negative flick instead of over stressed their plane in figure 3, double roll in 7 was not necessary but ok , judges will have to focus on AOA in fig 9. Overall rather high K but not too tricky, good for altitude and cross box as well

RANKING 1

Proposal C

Figure one too high G's

NOT RANKED

Proposal D

The 2 45° lines in 4 and 6 will make it very tough to stay in the box unless very high G's(negative) in figure 5

No need for the late push down in 7

NOT RANKED

Proposal E

The combination 1 and 2 too complicated unless having a lot of Horse power

Hard negative G's in 6

NOT RANKED

Proposal F

Too much risk to tend to flick high speed in Figure 2 to be able to finish it properly

Need too high speed after the slide to succeed in figure 8

NOT RANKED

Proposal G

Judges will have to focus on AOA in fig one.

Quite hard to stay in the box during 5, 6 and 7 even with head wind, not good with line judges…since pilots need rather high speed on top of 7

RANKING 3

Proposal H

Split S in 9 a bit late taking in account the number of Negative flicks before and the outside rolling turn (risk of grey…black out)

However quite interesting cross box figures

NOT RANKED

Proposal I

Quite high (Too high?) overall K , rolling turns a bit hard at high speed after double flick in 8

Fig 4 requires high speed to balance the ¾ neg on the way up

Fig 1, 2, 5 and 6 requires to sustain quite high positive G's, especially in 5 to have a nice top corner after the double roll

RANKING 4

Jeff Boerboon's Analysis

Advanced Programme Q/Known

Proposal A

Figure 3 will be difficult to keep in the performance area after the downwind 45 in figure 2. The pace of the sequence slows down at the end of figure 4 and will be low energy for figure 6.

There is a good mix of figures, rolls and flicks in the program.

Proposal B

The K factor in figure one is very high and the flick after the roll is going to create a problem with exceeding the limitations for flick speed. After the flick it will then be difficult to gain enough energy for the full roll on the vertical up line.

Figure 4 and 8 will be out on the downwind side of the box and will create a problem for judging accurately. Do not think push ¾ of a loop in figure 8 is necessary in an advanced Q program.

Pitching downwind for the ½ flick on figure 5 and 7 is not the best for figure presentation.

Proposal C

There are 3 figures with less than 20 K, which is too low for an advanced sequence, and the total K is low.

Figure 3 will be flown out of the box downwind. There is not enough altitude gain in figure three to do the spin in figure four without starting the sequence at very high altitude.

With figure 6 being flown at center box it will likely lead to figure 7 forced out of the performance area downwind.

I do not think that the push out of the humpty in figure 8 at the end of the sequence is very safe.

Proposal D

Figure 3 will be difficult to keep in the performance zone followed by a long line back into the box for figure 4.

The looping portions of figure 4 and 5 on the Y-axis do not give the judges an opportunity to grade the figure properly.

There are 5 figures with significant negative G's and do not feel that it enhances the program from a piloting skill standpoint.

Proposal E

Good mix of figures and rolls. I think it may have a problem with being out on figure 3 and 7 downwind. Only 2 half loop up pushes and the flow and pace is good.

Proposal F

This sequence has good balance of figures and figure K even though the total K is on the high side. I do not think that the loop on figure 4 allows the judges to grade the figure properly.

There will be low energy out of figure 5 into figure 6.

Proposal G

The highest K figure in this sequence is the rolling 360-degree turn which is not a good test of pilot skill and it is a difficult figure to grade well.

There is low energy out of figure 3 into figure 4 and will be very difficult for anything less than the most powerful aircraft.

There is the same issue coming out of figure 6 into figure 7. The loop on figure 6 on the Y-axis and figure 7 will move downwind which will lead to figure 8 being flown out of the box downwind.

Rank Order of the Advanced Q programs

I evaluated the sequences and compared many aspects of each including number of flicks, total K and figure K, number of inherent box outs, low energy points and number of pushes among other attributes. I put the sequences into for groups. Group 1 is my highest rank with group 2 second. I would not recommend the sequences in group 3.

Group 1
Proposal E and F

Group 2
Proposal A and D

Group 3
Proposal B, C, and G

Unlimited Programme Q/Known

Proposal A

I do not think that we need to start a sequence inverted. Even in the free unknowns when the sequence designers construct a sequence that would have an inverted start they precede that figure with a half roll to upright.

There are four high speed negative G pushes in this sequence with 3 of them in a row (fig 7and 8). I think that a sequence that challenges the pilot mentally is a stronger test of skill than one that punishes the head.

There is no tail slide, and I think that a 360 rolling turn slows down and disrupts the flow of the sequence.

Figure 4 is the only cross-box figure and the two humpties cancel each other out.

The sequence has a nice mix of roll elements with an average K value and 7 snaps.

There is one possibility for a box out on figure 5. Figure 4 will move downwind and will make the downwind 45 on figure 5 difficult to keep in.

Proposal B

This sequence has 2 low energy concerns. Figure one has a total of 1080 degrees of rotation and to draw a line after the flick roll will be an unnecessary challenge. Also there is low energy for the 4 of 2 on figure 3, which is more of a challenge for the airplane and not the pilot skill.

I do not think the organization of figures 4 and 5 will present well and will cause a dead spot in the sequence. After figure 4 there is going to be a very long empty line into the wind to set up for figure 5.

Figure 8 will likely be out down wind after the down wind 45 on figure 7.

The sequence is not as strong in the roll and flick selection as proposal A and is on the high end of the sequence K.

I do not think that the push in figure 9 is necessary and particularly at the end of a difficult sequence.

Proposal C

This sequence has 5 down line flicks but should not present an altitude issue.

There are many figures that will mentally challenge the pilot to consider position and roll direction. This will present difficulty without the unnecessary use of negative G's in the Q program.

The sequence will flow throughout and has not problems with going out of the box.

There are 8 flicks and average sequence K with a good mix of figures.

Proposal D

There are many issues with energy and box position in this sequence. There are also 5 hard pushes that are not going to gain anything from a pilot skill level. The push in figure 7 I feel is completely out of line.

Figure 1 has a push around that will not come out with enough energy to fly figure 2.

The down wind 45 in figure 3 followed by the downwind 45 in figure 4 will take figure 4 out of the box. Then the end of figure 4 has a 45 into the wind followed by the tail slide and another 45 into the wind. This is not the most optimum way to present figures.

If you are able to keep figure 6 in the box figure 7 will move downwind followed by another downwind 45 (fig 8) which will lead to another out on figure 9.

There are only 2 figures with higher than average k value and the sequence as a hole is low in K.

Proposal E

Again I do not believe that we need to punish ourselves with so many hard pushes. There are other ways to challenge pilots. The push in figure 9 may also present a safety concern at the end of a difficult sequence.

Figure one will not allow the pilot the opportunity to control the speed for the flick roll and may lead to exceeding aircraft limits. The energy out of figure one will be low after the flick for figure 2.

Figure 6 will likely be out upwind. Then the sequence has a slow pace with a long line after figure 7 and low energy into figure 8 followed by a slow speed 8-point roll.

There are only 2 figures with higher than the average k value and the sequence as a hole is low in K.

Proposal F

Figure 1 and two will not be able to be flown except by aircraft with the most performance.

Most airplanes can manage the ¼ roll and the 1 and ¼ flick on figure one but there would be nothing left for the line after the flick and the half loop at the top. Figure 2 is likely going to lead to a pilot falling out of the figure after the 1 ½ flick on the 45 line and then trying to push around to upright.

The end of figure 4 going downwind followed by two figures on the downwind side of the box will leave figure 5 out of the box and then will leave a long line back into the box for figure 6.

Presenting the 45 line on the Y axis in figure 4 gives very little chance for the judge to grade the figure.

The 360 rolling turn in very high K for a figure that is not easy to grade and is not necessarily a good test of pilot skill and the total K for the sequence is high.

Proposal G

This sequence is too similar to the 2012 Q program.

It does not have a tail slide. Figure 8 will be low energy after the flick combination on figure 7. Also figure 6 is low energy after the rolling turn.

The sequence K is good.

Proposal H

A significant issue in this program is the altitude after figure 3. The half loop up does not allow for enough altitude to safely do the spin unless the start of the sequence is very high. In clear weather maybe not a factor but if we are flying 1000m cloud bases it could be a issue.

The line out of figure 3 will be long and disrupt the flow of the sequence to go all the way up wind for the spin. Then the cross box humpty followed by the downwind humpty of figure 4 could lead to the loop of figure 5 to go out of the box downwind.

There are 5 or 6 figures in this sequence that are too basic for unlimited.

Proposal I

Figure 1 has the same problem as figure 1 of proposal F. The roll combination on the vertical up line will be more of a challenge for the plane than the pilot.

After the downwind 45 of figure 2 it will be very difficult to keep the tail slide in the performance zone.

There is low energy coming out of figure 6 into seven. The figure K is well balanced however the sequence K is high. This 360-degree rolling turn at the end of the sequence is less disruptive to the pace and flow but I still don't think that 360 rolling turn from a piloting skill versus how difficult to judge is the best idea.

Rank Order

I evaluated the sequences and compared many aspects of each including number of flicks, total K and figure K, number of inherent box outs, low energy points and number of pushes among other attributes. I put the sequences into for groups. Group 1 is my highest rank with group 2 second and group 3 third. The sequences in group 4, I would not recommend.

Group 1
Proposal C and I

Group 2
Proposal A and B

Group 3
Proposal G and H

Group 4
Proposal D, E and F

Advanced Sequence Rankings

Evaluator	A	B	C	D	E	F	G
Cassidy (GBR)	1	4	NR	5	2	3	NR
Bichet (FRA)	3	NR	NR	1	2	4	NR
Mamistov (RUS)	2	5	NR	3	1	4	NR
Roulet/Bessiere (FRA)	4	NR	NR	1	3	2	NR
Morrissey (USA)	NR	1	NR	NR	2	NR	NR
Vecko (CZE)	3	2	7	4	1	6	5
Paris (FRA)	2	NR	NR	4	1	3	NR
Boerboon (USA) *	2	3	3	2	1	1	3

* Boerboon ranked the sequences into three groups rather than ranking each sequence. The group numbers are shown above in his rankings.

Advanced sequence receiving most 1st place rankings was "E" (four). It received three 2nd place rankings.

Unlimited Sequence Ratings

Evaluator	A	B	C	D	E	F	G	H	I
Cassidy (GBR)	1	3	7	4	NR	7	2	5	5
Mamistov (RUS)	3	1	2	8	9	5	6	4	7
Roulet/Bessiere (FRA)	5	3	2	NR	6	8	1	4	7
Morrissey (USA)	3	NR	4	2	NR	NR	5	1	NR
Paris (FRA)	2	1	NR	NR	NR	NR	3	NR	4
Boerboon (USA) *	2	2	1	4	4	4	3	3	1

* Boerboon ranked the sequences into three groups rather than ranking each sequence. The group numbers are shown above in his rankings.

Unlimited sequence receiving most 1st rankings was "B" (two). It received one 2nd place ranking and two 3rd places.

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Evaluator	A	B
Cassidy (GBR) *	NR	NR
Mamistov (RUS)	1	NR
Vecko (CZE)	2	1

* Cassidy did not rate the sequences but provided comments.

Ratings were inconclusive.