AGENDA ITEM 9a

KNOWN ANALYSIS WORKING GROUP REPORTS

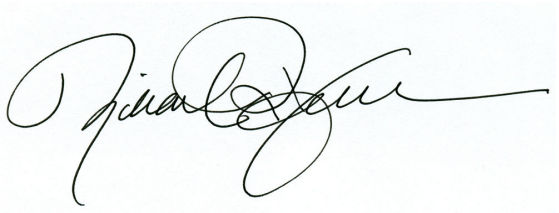
Proposed Known Programmes 2015

The CIVA Known Analysis Working Group was formed to provide Delegates with expert advice on the quality, safety, and flyability of Known sequences submitted to CIVA for consideration. The Working Group is made up of experienced pilots 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 was 15 September 2014. Nine countries responded with proposals. Immediately after the deadline closed, the sequences were all checked, re-drawn, and de-identified by Brian Howard (USA). The Known Proposals Agenda Package was then prepared, posted on the CIVA website, and sent to all of the analysts.

The analysts were asked to present their findings in table format and to rank each sequence as well as grade it from 0 to 10. A zero would be assigned to any sequences they regarded as unsafe or unsuitable for the category. Thanks to all of them for their contributions.

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
Chairman, CIVA Rules Sub-Committee

Version 3
27 October 2014

Alan Cassidy's Analysis

Unlimited 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, nor 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	No doubt some pilots could fly this sequence in some aeroplanes. However, this known programme must be flown by all pilots in all aeroplanes. Figures 1, 4, 6 and 9 all present problems of available thrust and control or aircraft structural integrity, or excessive flick speed and combinations likely to cause brain damage after serial repetition.	0	Not ranked
B	Figure 2 will possibly lead to some inconsistency between judges concerning observation of the use of aileron in extended, low speed negative flick rolls. Otherwise the sequence is suitable as a Known for Unlimited competition.	6.5	2
C	This sequence is a slightly revised version of Proposal A, implying collusion between delegates. It is rejected for the same reasons as Proposal A.	0	Not ranked
D	A relatively high K , technical sequence but generally flyable and without obvious framing issues. The inverted line between 4 and 5 will need to be short to avoid GLOC in figure 5. The double negative flick on Fig 8 may also lead to inconsistency in grading.	5	4=
E	Figures 2 and 3 both include significant positive looping segments after exposure to sustained negative G. The low speed, "wrong line" 1¼ positive flicks on Figs 1 and, especially, 7 may lead to judging inconsistencies.	5.5	3
F	Framing requires an exceptionally long period of slow upright flight prior to the spin on Fig 3, making this period lacking in harmony. The negative flick on Fig 4 carries a high risk of over-speeding and physiological damage to the pilot with serial repetition. Not ranked because of poor safety of this flick roll element.	0	Not ranked
G	Relatively low total K. Will probably attract criticism for being too simple, but this sequence will not deter new pilots from moving up	7	1

	to Unlimited.		
H	Framing and energy acceptable. However, prolonged high negative G period before 3/4 positive loop on Fig 6 is a big concern with regard to GLOC.	5	4=
I	This sequence is a slightly revised version of Proposal A, implying collusion between delegates. It is rejected for the same reasons as Proposal A.	0	Not ranked

Advanced 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 rather than just those types currently flying at Unlimited. 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	Descending rolls on Figs 2 and 3 will lead to a lot of energy loss, which cannot be fully recovered before the spin entry, for those flying 4-cylinder aircraft. Would be fairer to lower performance aircraft if the roll down on Fig 3 was just half.	5	5
B	Both Figs 2 and 5 have negative G followed by prolonged high positive G. Fig 7 requires very high power:weight ratio to complete the 5/8 loop after the climbing 4x8, in particular because there is no real way to enter Fig 7 at very high speed.	0	Not ranked
C	Fig 1 requires high thrust:weight after roll. Worse, there is prolonged negative G from Fig 2 into 3, to make ground into wind before Fig 4, immediately before a long hard pull for the positive flick. This carries, for me, too much risk of GLOC.	0	Not ranked
D	Fig 2 is testing for lower powered aircraft but can be done in context with practice. The rest is acceptable as long as there is only a short period of level flight before the spin/flick combination which will require anti-G straining technique. Good framing will make this just possible.	6	3
E	A relatively low-K sequence which starts reasonable but which then gets much less suitable after Fig 6. The early part of the sequence will have to be flown high to cater for the height loss in Fig 2 before the spin. Fig 8 after Fig 7 will strongly favour 6-cylinder aircraft and result in more height loss before Fig 9.	4	6

F	Another sequence with prolonged inverted flight, an inverted spin and then a long hard pull to a positive flick. In this case, the downwind 45 lines on Figs 3 and 4 mean that pilot will have to make a lot of ground into wind before the spin, making GLOC much more likely. This sequence is therefore rejected for safety reasons.	0	Not ranked
G	This sequence presents no insuperable problems for lower powered aircraft and can be well positioned as long as the aircraft drives un-harmoniously into wind before the spin. Figs 4, 6 and 7 result in significant height loss, so there is a probability of low excursions before Fig 8 unless the down line on 7 is very short.	6.5	2
H	This sequence is adequately testing and is able to be flown by lower performance aircraft. Positioning can be good as long as Figs 3 and 6 are driven into wind. Fig 7 is useful for rebuilding energy if required.	7.5	1
I	Low-powered aircraft may have problems driving into wind after the climbing 2x4 on Fig 1. Then 3 and 4 will probably go out downwind. Figs 4 and 7 will result in significant energy loss with a strong risk of low excursions after Fig 7, especially for 4-cylinder aircraft.	5.5	4

Coco Bessiere's Analysis

Unlimited Known

	Comments	Score	Rank
A	Safety: No Interest:#1 difficult for many aircraft. Figure #3: wrong sense for direction with official wind Figure #4: too high speed for flick Figure #5: roll 2/2 too big loss of altitude Figure #6: ? beautiful drawing Figure #7: not easy Figure #9: too low and probably too high speed for negative flick	0	Not ranked
B	Safety:OK Interest:figure #1 loss of altitude. Figure #4, #5, #9: flicks in the wrong sense for direction with official wind	5	4
C	Safety: No in figure#5, #6, #9 Interest: Figure#1? Figure #6? Figure #7?		Not ranked
D	Safety:OK Interest: Interesting and challenging sequence. All flicks	8	1

	Comments	Score	Rank
	good for official direction with the wind		
E	Safety:OK Interest:Flicks figure #1 and #4 not good for official direction with the wind. A lot of flicks (10). Challenging sequence for beginners and unlimited level.	6	2
F	Safety:OK Interest: Flicks figures #2 and #3 in wrong sense for direction with the official wind. Box difficult for #6, #7, #8 with different winds (not fair).	5.5	3
G	Safety:OK Interest: Few points. Few flicks (figure #2 and #4 in wrong sense of wind).	5	4
H	Safety:No. Line 45 diving in #8. Interest: Figure #2 and #5: a lot of negative Gs and risk of grey/black out in figure #6.		Not ranked
I	Safety:Not good. Interest: Almost the same than sequence A and C.	0	Not ranked

Advanced Known

	Comments	Score	Rank
A	Safety: OK (if figure #3 only half roll diving) Interest: Well balanced. Good correction wind. #3 flick not in correct direction with official wind and lot of loss of altitude in one and a half roll diving. Only half roll could be enough for advanced level.	8.5	1 (if correction of figure #3)
B	Safety: OK Interest: Figure #2: negative flick not for beginners in advanced level Figure #3: no Figure #4: no Figure #6: dangerous Figure #8: limit for altitude	0	Not ranked
C	Safety: OK (if figure #5 only ¾ (mind grey out in #3)). Interest: Positioning in the box OK	7.5	3 (if correction figure #5)
D	Safety: OK (mind grey out in figure #5) Interest:#1 difficult to judge incidence. Well balanced sequence.	8	2
E	Safety: OK Interest: Positioning box difficult to show figure #9	7	4
F	Safety: No in figure #1 and figure #7	No score	Not ranked

	Comments	Score	Rank
	Interest:		
G	Safety: OK Interest: in figure #1, uninteresting 45 diving line. Figure #6: not very interesting for beginners in that level.	6.5	5 (if correction #1)
H	Safety: OK Interest: #4: too many rolls downwind, so not very fair for aircraft with light rate of roll.	6	6 (if corrected in #4)
I	Safety:No safe. Dangerous. Interest: No interest.	0	Not ranked

Yak 52 / Intermediate

	Comments	Score	Rank
A	Safety:OK Interest:Only one flick.	7	2
B	Safety:OK Interest:Good sequence.	9	1

Nigel Hopkins' Analysis

Unlimited Known			
	Comments	Score	Rank
A	Fig 1, potentially insufficient energy for the inverted cap off after opposite rolls including negative snap roll. Fig 3, potentially dangerous high-speed positive snap roll after pull down for aircraft with high acceleration. Fig 9, potentially dangerous high-speed negative snap roll after opposite snap rolls on 45 down line. Positioning, late cross-box figure.	0	NR
B	3 cross-box figures, good for positioning and also challenging for navigation. Good mix of difficult figures and variation in rolling types. Management of energy and altitude should be good. Relatively high total K.	8	2
C	Fig 1, potentially insufficient energy for inverted cap off after opposite rolls including negative snap roll.	0	NR

	Fig 5, potentially dangerous high-speed positive snap roll after pull down for aircraft with high acceleration. Fig 9, potentially dangerous high-speed negative snap roll after opposite snap rolls on 45 down line. High amount of negative G		
D	Good mix of figures and different rolling types. Fig 4, good use of double humpty for cross-box positioning. High number of snap rolls but energy management and altitude should be good. Good difficulty and total K.	9	1
E	Fig 1, low performance aircraft may have energy issues with opposite rolls on 45 up line. Good challenging figures. Good cross-box options for positioning. Very high number of snap rolls but energy management and altitude should be good overall.	6	3
F	Good mix of figures and difficulty. Limited use of cross-box figures, cross-box figures are in same direction, which makes positioning difficult in calm conditions and also with a cross-box wind component.	3	5
G	Fig 1,3,7,8 Simple for Unlimited, better suited to Advanced. Overall lack of difficulty.	0	NR
H	Fig 2, 5 high sustained negative G. Low number of snap rolls. Fig 3 only cross-box figure. Limited options in windy conditions.	4	4
I	Fig 1, potentially insufficient energy for the inverted cap off after opposite rolls including negative snap roll. Fig 9, potentially dangerous high-speed negative snap roll after opposite snap rolls on 45 down line. Some high negative G figures.	0	NR

Advanced Known

	Comments	Score	Rank
A	Good variation of figures and rolls. A well balanced sequence. Positioning and Altitude management is good. Low number of snap rolls.	9	1
B	Negative snap roll, more an unlimited sequences. Very simple fig 1. Low number of snap rolls.	0	NR

C	Fig 1, 2 long line downwind, potential positioning problem with strong wind. Fig 3, High difficulty, Positive Snap Roll from a negative line, more an Unlimited figure.	0	NR
D	Fig 1, high difficulty snap roll from Knife-edge for Advanced, more an Unlimited figure. Very simple fig 4.	0	NR
E	Good mix of figures and difficulty. Good cross-box elements for positioning. A little low on overall difficulty and total K.	8	2
F	Fig 2 simple. Fig 3, 4 long downwind line, will make positioning difficult in wind. Overall, many cross-box elements, keeping the presentation ideal for the judges will be challenging.	6	4
G	3, 7, very simple figures, sequence a little low on overall difficulty and total K. Low number of snap rolls. Good cross-box figures for positioning in strong or no wind.	5	5
H	Good balance of figures. Only 3 snap rolls. Overall difficulty and total K a little low.	7	3
I	Fig 2, 3, 4, sequence difficult on energy management, particularly for the roller after vertical down-line. 7, 8, 9, Long line in one direction, will be difficult for positioning with no wind. Good variation of base figures. Only 2 snap rolls.	4	6

Yak-52 / Intermediate Known

	Comments	Score	Rank
A	Inverted spin, a challenge for Intermediate, more an Advanced Figure. Fig 7, challenge on energy for YAK52 and low power Intermediate aircraft.	0	NR
B	Well balanced sequence. Good on energy management and positioning.	9	1

Mikhail Mamistov's Analysis

Unlimited Known

	Comments	Score	Rank
A	High speed flick on fig #4; There is a risk of G-LOC on the bottom of Fig #4; Fig #1 – for powerful aircraft; Fig #7 – tailslide after the flick; Fig #9 – start of the negative flick at high speed; Strong possibility of too low altitude at the end of the sequence.	-	NR (safety)
B	Interesting and sufficiently challenging sequence, but: Fig #6 – too high speed for a negative flick roll thus there is a chance to «break a head», otherwise this maneuver is only for powerful aircraft.	-	NR (safety)
C	Same problems as in "A" High speed flick on fig #5, There is a risk of G-LOC on the bottom of Fig #5; Fig #1 – for powerful aircraft; Fig #7 – tailslide after the flick; Fig #9 – start of the negative flick at high speed; Possibility of too low altitude at the end of the sequence.	-	NR (safety)
D	Interesting and sufficiently challenging sequence. High K.	7	2
E	Sufficiently challenging sequence. High K. Fig ##1, 9 - for powerful aircraft.	4	3
F	Physically difficult sequence due to many elements with negative G; Fig #5 – tailslide after the flick. Not a good sequence positioning wise: - Too long line at low speed is needed before Fig #3; - Possibility of an out on Fig #8.	3	4
G	Good enough sequence. Moderate K.	8	1
H	Physically difficult sequence due to high speed and long (135°, 270°, 180°) elements with negative G at fig ## 1, 2, 5. Not good energy management between Fig. #3 and #4.	2	5
I	Speed is too low for fig #5. Fig #1 – for powerful aircraft; Fig #7 – tailslide after the flick; Fig #9 – start of the negative flick at high speed. Strong possibility of too low altitude at the end of the sequence.	-	NR

Advanced Known

	Comments	Score	Rank
A	Good sequence.	9	1
B	Fig #2 can be difficult for Advanced category; Fig ##1, 2 – repetition of a half roll 9.1.3.2.	2	8
C	Good enough sequence. Cross-box looping segment on Fig. #3 is not good for judging.	8	2
D	Fig #1 can be difficult for Advanced category; Fig #6 – bad cross-wind correction if crosswind component is strong enough; Fig #4 is too simple for Advanced category.	4	6
E	Good enough sequence. Cross-box looping segment on Fig. #9 is not good for judging.	7	3
F	Fig #1 – there is a risk of G-LOC at positive G-load after negative one; Fig ## 3, 4 - two 45 degree downwind lines one after another is a possibility to get an "out" at Fig #4.	0	NR (safety)
G	Not a good sequence positioning wise: - Too long line at low speed is needed before Fig #3 - Cross-box looping segment on Fig. #5 is not good for judging.	5	5
H	Normal sequence.	6	4
I	Fig #6 can be difficult for Advanced category. The sequence can be physically difficult due to figures with negative G. Only 2 flick rolls.	3	7

Yak-52 / Intermediate

	Comments	Score	Rank
A	Fig.#7 is not for Yak-52.	-	NR (safety)
B	Good enough sequence. Fig #8 and #9 combination is not too good for Yak-52	8	1

Advanced Sequence Rankings

Evaluator	A	B	C	D	E	F	G	H	I
Cassidy (GBR)	5	NR	NR	3	6	NR	2	1	4
Mamistov (RUS)	1	8	2	6	3	NR	5	4	7
Bessiere (FRA)	1	NR	3	2	4	NR	5	6	NR
Hopkins (RSA)	1	NR	NR	NR	2	4	5	3	6

Advanced sequence receiving most 1st place rankings was "A".

Unlimited Sequence Ratings

Evaluator	A	B	C	D	E	F	G	H	I
Cassidy (GBR)	NR	2	NR	4	3	NR	1	4	NR
Mamistov (RUS)	NR	NR	NR	2	3	4	1	5	NR
Bessiere (FRA)	NR	4	NR	1	2	3	4	NR	NR
Hopkins (RSA)	NR	2	NR	1	3	5	NR	4	NR

Unlimited sequences receiving most 1st rankings were "D" and "G" (two each).

Yak 52/Intermediate Power

Evaluator	A	B
Cassidy (GBR)	NR	1
Mamistov (RUS)	NR	1
Bessiere (FRA)	2	1
Hopkins (RSA)	NR	1

Yak-52/Intermediate sequence "B" received all 1st place rankings.

Rules Chairman Note:

Due to safety reasons, it is recommended that the following sequences be eliminated from consideration by CIVA:

Advanced: B and F
Unlimited: A, C and I
Yak-52/Intermediate: A