International Aerobatic Club
Known Sequence Committee

Recommendations

To The

IAC Board of Directors

For Power and Glider Knowns

2019

Submitted by:
Brian K. Howard
Chairman, IAC Known Sequence Committee
November 2018

INTRODUCTION

The IAC Known Sequence Committee (KSC) is charged with developing the Known sequences for all power and glider competition categories. An excellent Known design must provide enough challenge that the sequence is fun to fly multiple times throughout the year, is not so challenging that it dissuades pilots from competing, reinforces skills which are necessary to continue growing in the category and which lay the groundwork should the pilot decide to move to a higher category. Sequences must take into account how wind affects airplanes of differing performance while avoiding designs which are beyond the capabilities of the baseline aircraft specified in the IAC *P&P Manual.* Above all, the sequences must be safe for pilots of all experience levels. All in all, quite a complex task, and somewhat paradoxically, the lower the category, the more difficult the task.

To accomplish this complex task, the KSC is composed of nine individuals, collectively with thousands of hours of aerobatic competition, instructing, and coaching experience in all categories through the Unlimited Team level. Among the Committee members are: one of the IAC's best known and respected instructors and coaches, who also hosts a perennially sold-out annual training camp for pilots of all experience and skill levels; the Chief Instructor for the John D. Odegard School of Aerospace Sciences at the University of North Dakota who can tell you exactly what any model Decathlon can and cannot do, safely and with an inexperienced student pilot at the controls; arguably one of the most successful IAC competitors in recent times in low-performance airplanes; and one of the top glider instructors in the nation, and U.S. Unlimited glider champion. Hands-on aircraft experience within the KSC ranges from high-drag, low-performance power airplanes like the Great Lakes and Citabria/Decathlon to airplanes in the class of the Extra 330SC and MX2, and in gliders from the DG-1000 up to the Swift and MDM Fox.

Besides applying their knowledge and experience to analyze and "chair fly" the proposed sequences, some of the KSC members test fly the Known proposals in the appropriate airplanes to ascertain the suitability of the proposal to the category. Altitude loss, ability to position in the box, energy management, and aircraft ability to perform the proposed figures are some of the attributes flight tested and included in the evaluations. When deemed necessary, experts from outside the Committee are also occasionally used to evaluate and/or test fly certain sequences, both power and glider.

This year, 31 Known proposals and variants of proposals in power and glider were evaluated and ranked by the KSC. Variants are the original proposed sequences with changes to complementary maneuvers or rearranging figure order to address concerns of the reviewers and test pilots.

The final proposals for the IAC 2019 Knowns shown on the following pages have been thoroughly evaluated, vetted, and in most cases, test flown, to ensure they meet every requirement of an excellent Known within the category for which they were designed. The KSC can recommend without reservation or caveat that each of the following Known sequences be approved by the IAC Board of Directors for the 2019 contest year.

PRIMARY (See Note Following Page)

B	Contest: PROPOSED	Category: Primary
Date: 2019	Program: Known	Pilot's No.

pilot

NAC

wind direction

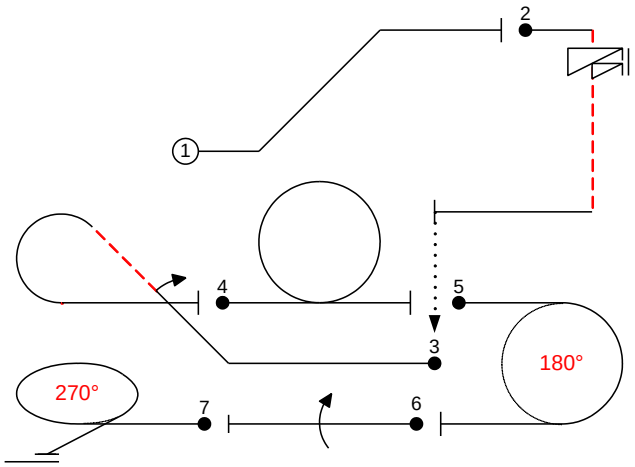

Fig 1 SF7	1.1.2.1	7	7
Fig 2 SF7	1.1.6.3 9.11.1.6	10 3	13
Fig 3 SF7	8.5.2.1 9.1.2.2	10 6	16
Fig 4 SF7	7.4.1.1	10	10
Fig 5 SF2	2.2.1.1	4	4
Fig 6 SF7	1.1.1.1 9.1.3.4	2 8	10
Fig 7 SF2	2.3.1.1	5	5
Total K 65			

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Concerning the 2019 Primary Known Sequence

While the Primary Known is often carried over unchanged year-to-year, the KSC recognized two issues with the 2018 Primary sequence that needed to be addressed:

First, we heard from Primary pilots that they would appreciate a slightly longer sequence in order to get more flight time for their contest registration dollar. Secondly, and more importantly, the 2018 Primary included a half-Cuban that was started downwind. If there is much of any X-axis wind, a low-speed, low-performance airplane (remember that gliders may fly the Primary as well) has no chance of floating the top of the 5/8th loop in order to maintain a constant radius, thus guaranteeing a downgrade on the highest K figure of the sequence.

By changing that half-Cuban into a half reverse-Cuban for the 2019 sequence, any X-axis wind will help, not hinder, the task of maintaining a sustainable radius during the 5/8th loop. An additional advantage of the reverse half-Cuban is that pilots can open up the radius of the 5/8th loop as necessary to gain sufficient energy for the full loop. In the 2018 sequence, the only choice for more energy was to hold the half-Cuban's 45-down line longer, which resulted in excessive altitude loss and even an overspeed potential, depending on the aircraft type.

Finally, to extend the length of the 2019 sequence, a 270-turn was added as the last figure. There are a very limited number of figures which are appropriate to the Primary category and the 270-turn was chosen, not just because it would add air time, but because it will help to teach the Primary pilot box awareness and orientation when determining turn direction.

SPORTSMAN POWER

B	Contest: PROPOSED	Category: Sportsman
Date: 2019	Program: Known	Pilot's No.

pilot

NAC

wind direction

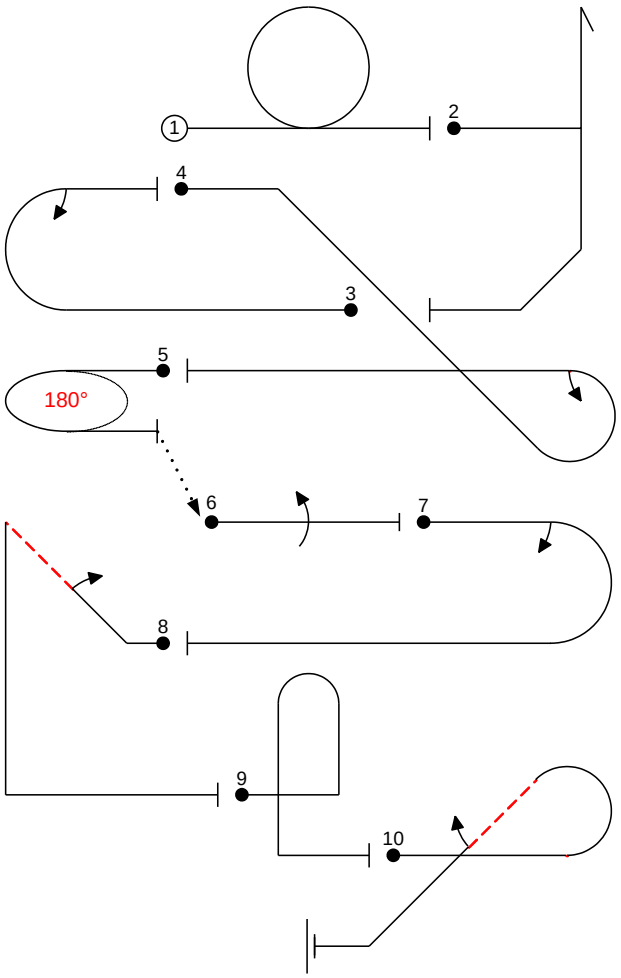

Fig 1 SF7	7.4.1.1	10	10
Fig 2 SF5	5.3.3.1	18	18
Fig 3 SF7	7.2.2.1 9.1.3.2	6 4	10
Fig 4 SF7	8.5.3.3 9.1.3.2	10 4	14
Fig 5 SF2	2.2.1.1	4	4
Fig 6 SF7	1.1.1.1 9.1.3.4	2 8	10
Fig 7 SF7	7.2.3.3 9.1.3.2	6 4	10
Fig 8 SF7	1.2.3.1 9.1.2.2	12 6	18
Fig 9 SF7	8.4.1.1	13	13
Fig 10 SF7	8.5.6.1 9.1.4.2	10 4	14
Total K 121			

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INTERMEDIATE POWER

B	Contest: PROPOSED	Category: Intermediate
Date: 2019	Program: Known	Pilot's No.

pilot / NAC

wind direction

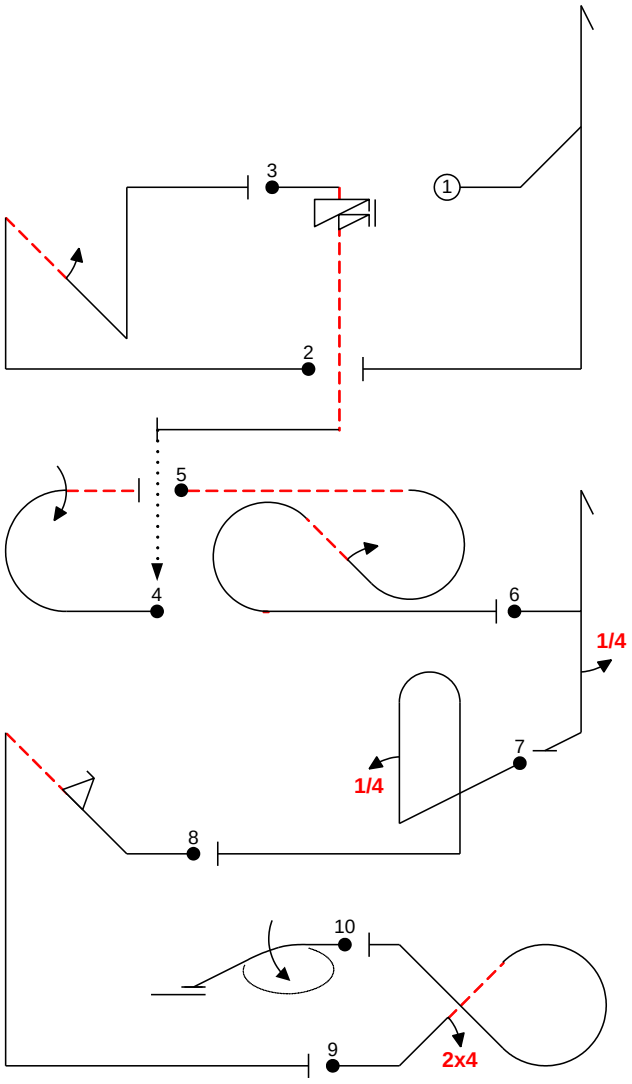

Fig 1 SF5	5.3.1.1	18	18
Fig 2 SF7	1.3.12.1 9.1.4.2	21 4	25
Fig 3 SF7	1.1.6.3 9.11.1.6	10 3	13
Fig 4 SF7	7.2.1.1 9.1.3.4	6 8	14
Fig 5 SF7	7.5.2.4 9.1.2.2	15 6	21
Fig 6 SF5	5.2.1.1 9.1.5.1	17 2	19
Fig 7 SF7	8.4.1.1 9.1.1.1	13 6	19
Fig 8 SF7	1.2.3.1 9.9.2.2	12 13	25
Fig 9 SF7	7.3.2.1 9.4.2.2	14 7	21
Fig 10 SF2	2.1.3.1	14	14
Total K 189			

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ADVANCED POWER

B	Contest: PROPOSED	Category: Advanced
Date: 2019	Program: Known	Pilot's No.

pilot / NAC

wind direction

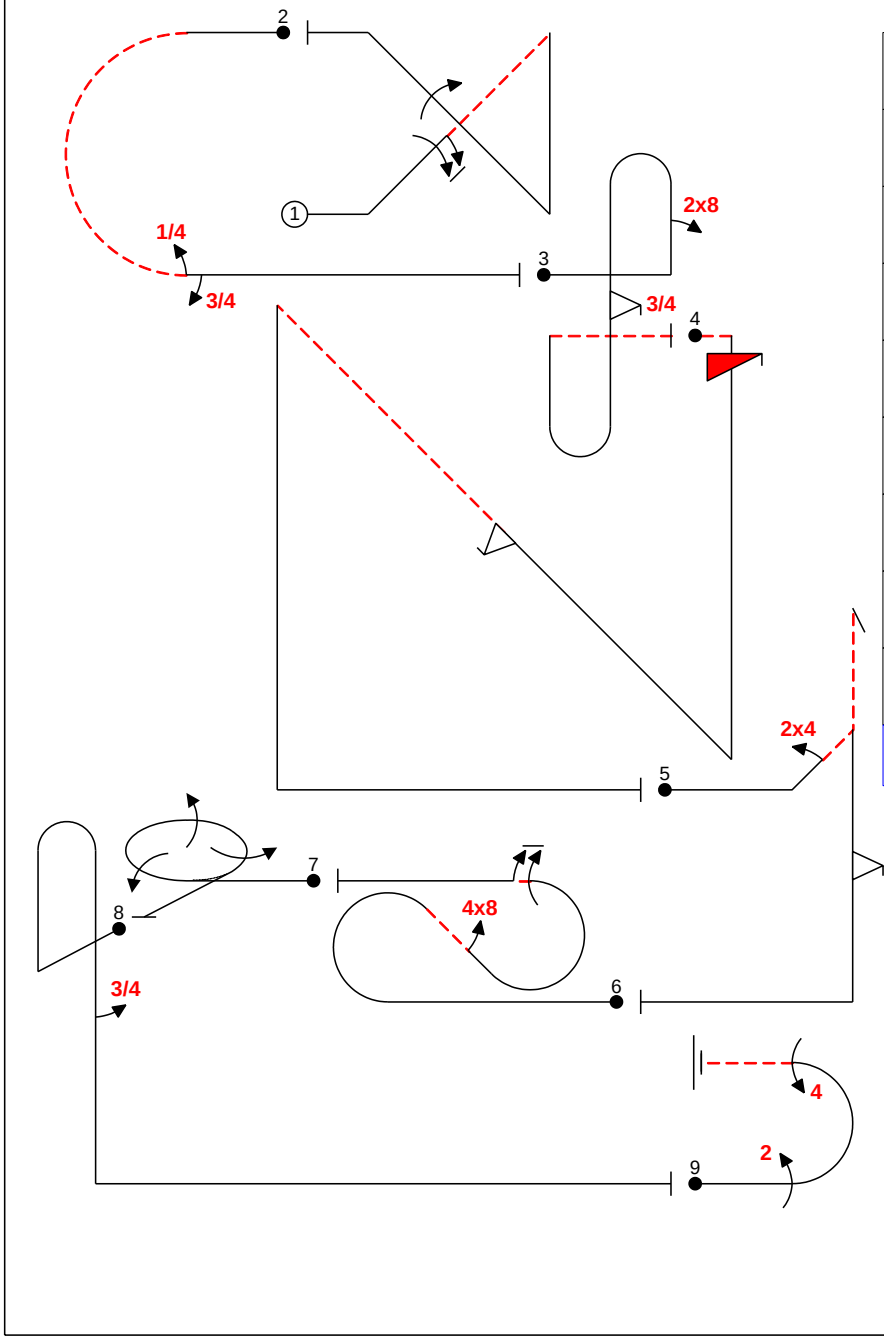

Fig 1 SF7	1.3.2.1 9.1.2.6 9.1.2.4	18 12 10	40
Fig 2 SF7	7.2.2.3 9.1.3.1 9.1.3.3	8 2 6	16
Fig 3 SF7	8.8.1.1 9.8.1.1 9.9.5.3	18 7 11	36
Fig 4 SF7	1.3.11.4 9.12.1.4 9.9.2.2	20 7 13	40
Fig 5 SF5	5.3.2.1 9.4.2.2 9.9.5.2	24 7 11	42
Fig 6 SF7	7.5.7.1 9.8.4.2 9.1.3.6	15 7 10	32
Fig 7 SF2	2.3.4.3	33	33
Fig 8 SF7	8.4.1.1 9.1.5.3	13 6	19
Fig 9 SF7	7.2.1.1 9.2.3.4 9.4.3.4	6 9 11	26
Total K 284			

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UNLIMITED POWER

B	Contest: PROPOSED	Category: Unlimited
Date: 2019	Program: Known	Pilot's No.

pilot / NAC

wind direction

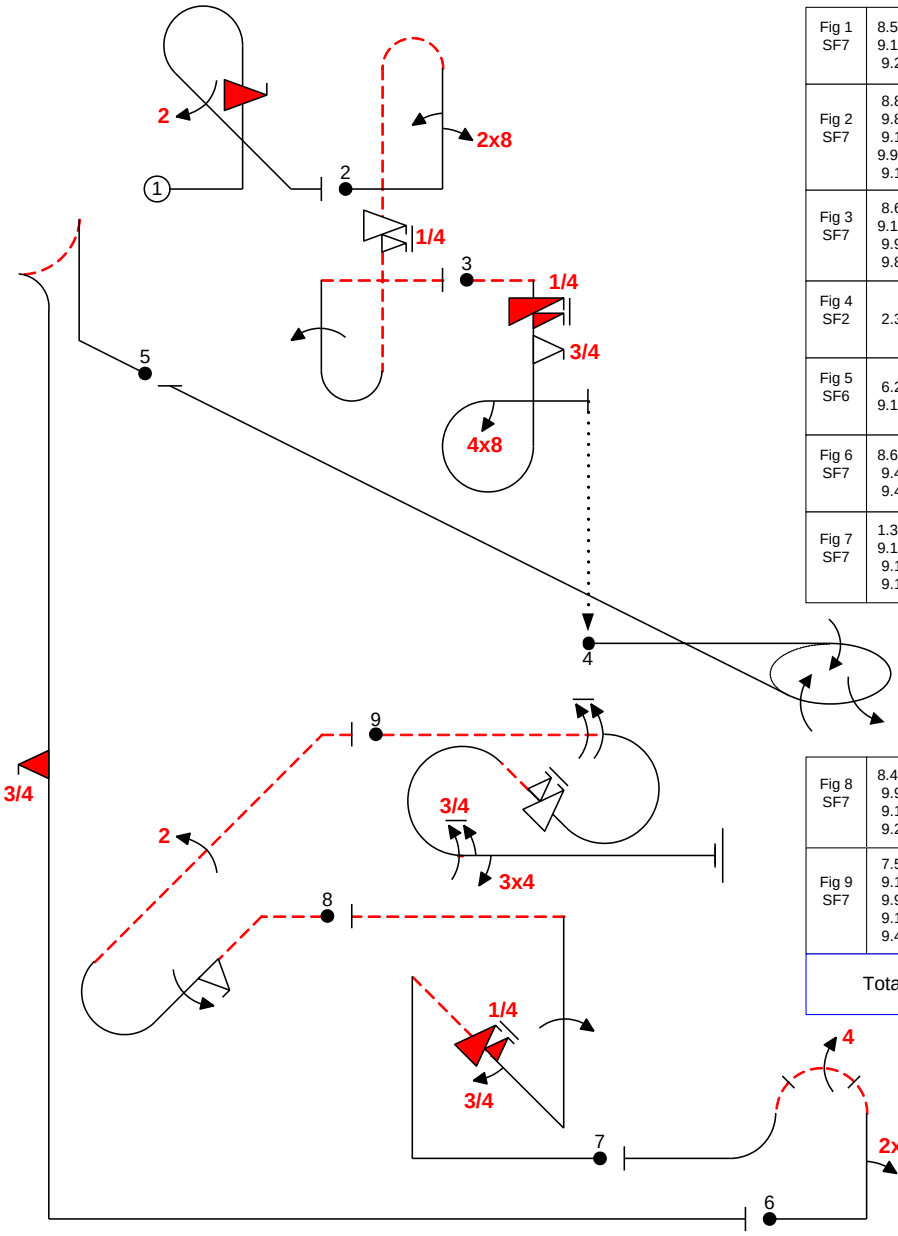

Fig 1 SF7	8.5.17.1 9.10.6.4 9.2.4.4	12 19 9	40
Fig 2 SF7	8.8.5.1 9.8.1.1 9.1.1.2 9.9.10.5 9.1.1.4	21 7 8 15 12	63
Fig 3 SF7	8.6.2.4 9.12.1.5 9.9.5.3 9.8.3.2	12 6 11 7	36
Fig 4 SF2	2.3.5.1	35	35
Fig 5 SF6	6.2.2.1 9.10.5.3	15 13	28
Fig 6 SF7	8.6.11.1 9.4.1.2 9.4.3.4	13 9 11	33
Fig 7 SF7	1.3.11.1 9.10.4.5 9.1.4.3 9.1.1.4	20 15 6 12	53
Fig 8 SF7	8.4.15.4 9.9.9.2 9.1.4.4 9.2.2.4	13 13 8 11	45
Fig 9 SF7	7.5.2.4 9.1.3.8 9.9.2.6 9.1.3.7 9.4.3.3	15 12 16 11 8	62
Total K 395			

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SPORTSMAN GLIDER

B	Contest: PROPOSED	Category: Sportsman Glider
Date: 2019	Program: Known	Pilot's No.

pilot / NAC

wind direction

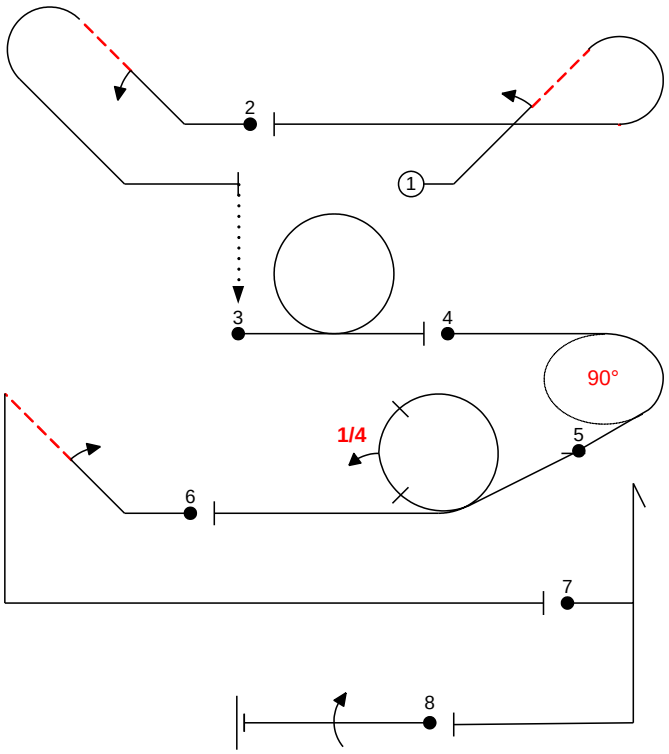

Fig 1 SF7	8.5.2.1 9.1.2.2	10 9	19
Fig 2 SF7	8.4.15.1 9.1.2.2	12 9	21
Fig 3 SF7	7.4.1.1	10	10
Fig 4 SF2	2.1.1.1	3	3
Fig 5 0	0.1	16	16
Fig 6 SF7	1.2.3.1 9.1.2.2	12 9	21
Fig 7 SF5	5.2.1.1	17	17
Fig 8 SF7	1.1.1.1 9.1.3.4	2 12	14
Total K 121			

Glider

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INTERMEDIATE GLIDER

B	Contest: PROPOSED	Category: Intermediate Glider
Date: 2019	Program: Known	Pilot's No.

pilot

NAC

wind direction

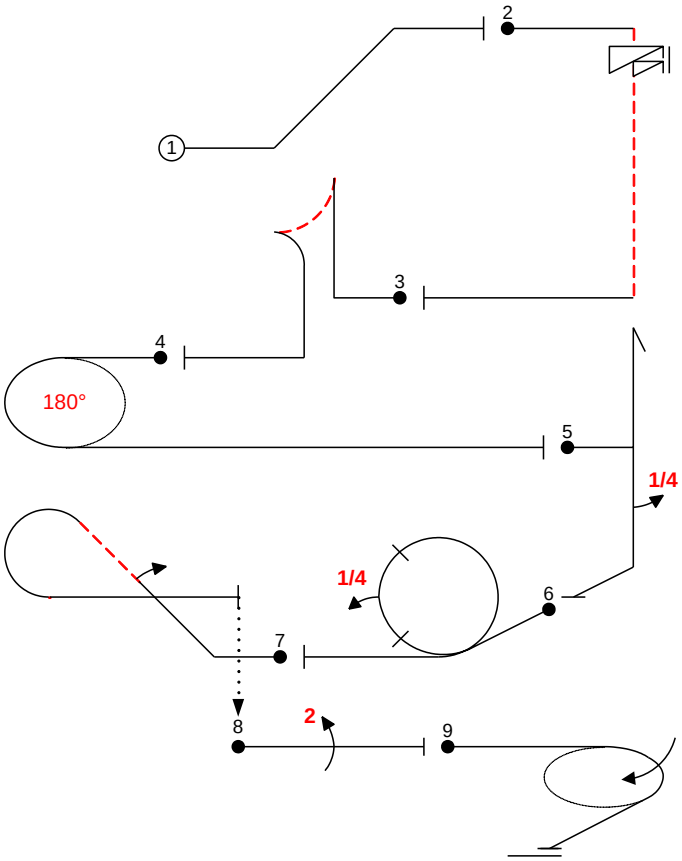

Fig 1 SF7	1.1.2.1	7	7
Fig 2 SF7	1.1.6.3 9.11.1.6	10 7	17
Fig 3 SF6	6.2.2.1	17	17
Fig 4 SF2	2.2.1.1	4	4
Fig 5 SF5	5.2.1.1 9.1.5.1	17 3	20
Fig 6 0	0.1	16	16
Fig 7 SF7	8.5.2.1 9.1.2.2	10 9	19
Fig 8 SF7	1.1.1.1 9.2.3.4	2 14	16
Fig 9 SF2	2.1.3.1	19	19
Total K 135			

Glider

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ADVANCED GLIDER

B	Contest: PROPOSED	Category: Advanced Glider
Date: 2019	Program: Known	Pilot's No.

pilot

NAC

wind direction

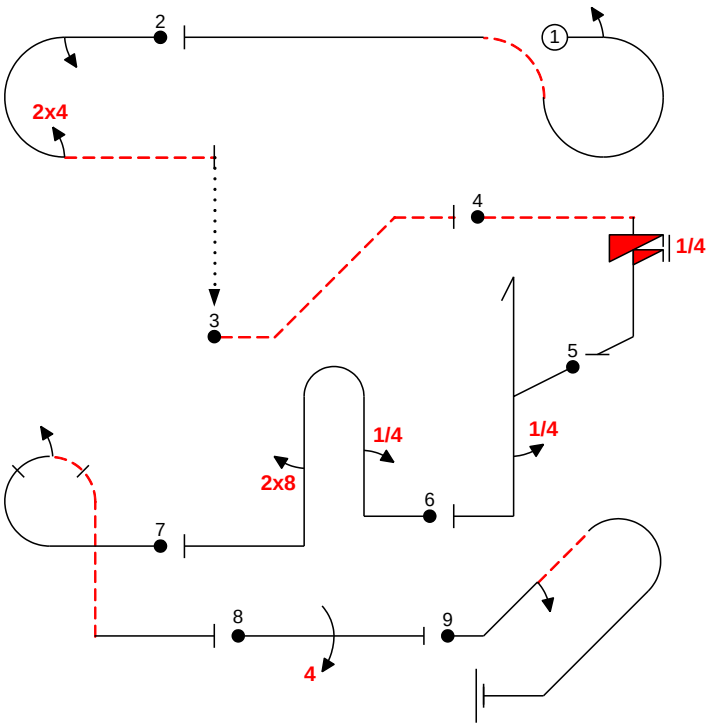

Fig 1 SF7	7.4.9.3 9.1.3.2	11 6	17
Fig 2 SF7	7.2.4.3 9.1.3.2 9.4.3.2	6 6 8	20
Fig 3 SF7	1.1.2.2	8	8
Fig 4 SF7	1.1.7.4 9.12.1.5	9 8	17
Fig 5 SF5	5.2.1.1 9.1.5.1	17 3	20
Fig 6 SF7	8.4.1.1 9.1.1.1 9.8.5.1	13 9 5	27
Fig 7 SF7	8.6.22.1 9.1.3.2	13 6	19
Fig 8 SF7	1.1.1.1 9.4.3.4	2 17	19
Fig 9 SF7	8.4.15.1 9.1.2.2	12 9	21
Total K 168			

Glider

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UNLIMITED GLIDER

B	Contest: PROPOSED	Category: Unlimited Glider
Date: 2019	Program: Known	Pilot's No.

pilot

NAC

wind direction

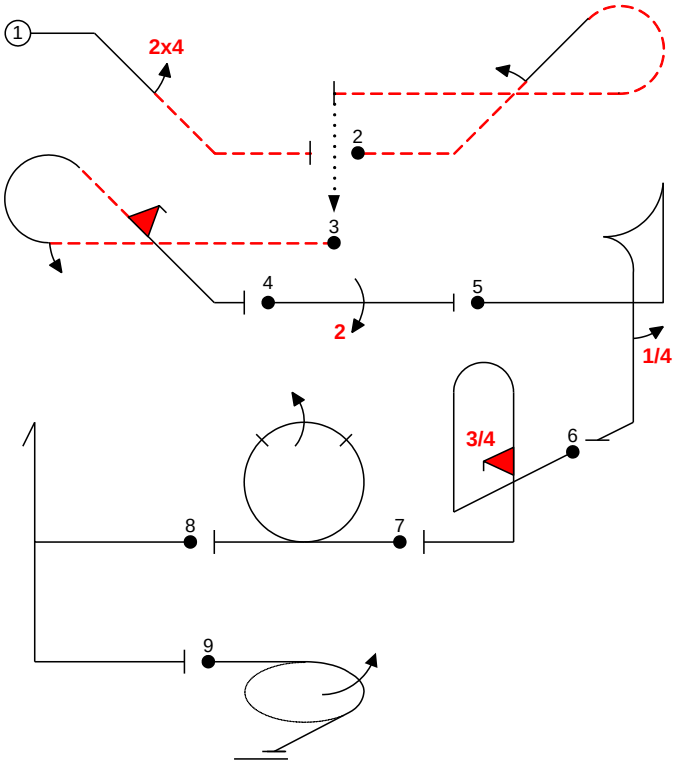

Fig 1 SF7	1.1.3.3 9.4.4.2	8 8	16
Fig 2 SF7	8.5.2.2 9.1.2.2	14 9	23
Fig 3 SF7	8.5.8.2 9.1.3.2 9.10.4.2	11 6 15	32
Fig 4 SF7	1.1.1.1 9.2.3.4	2 14	16
Fig 5 SF6	6.2.1.1 9.1.5.1	17 3	20
Fig 6 SF7	8.4.1.1 9.10.10.3	13 17	30
Fig 7 SF7	7.4.1.1 9.1.3.4	10 12	22
Fig 8 SF5	5.2.1.1	17	17
Fig 9 SF2	2.1.3.3	21	21
Total K 197			

Glider

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