SSA BADGE & RECORD GUIDE

It's true… rules and procedures are the last thing anybody wants to worry about on a great soaring day. Your most memorable flight or a personal best awaits - and it's all about the proverbial joy of soaring!

Even so, there's a difference between having an undeniably great soaring flight and earning an FAI Badge or Record achievement: the latter is done to Sporting Code Standards.

The next 14 pages can take "worry" out of the equation, helping you meet the challenge and reap the rewards in Badge and Record soaring.

Pilots, Official Observers and State Record Keepers alike can use this guide to…

- **Plan a flight for one or more Badge and/or Record claims**
- **Check out the wide variety of cross country task options**
- **Evaluate altitude, distance and speed claims accurately**
- **Maximize credited soaring performance**
- **Be aware of appeal procedures if a badge, record or award application is submitted and any claim is denied**

TERMS USED IN THIS GUIDE

FAI , IGC	The Federation Aeronautique Internationale and its International Gliding Committee -- the governing bodies overseeing Badge and World Record pursuits worldwide
SC3	FAI Sporting Code Section 3 for gliders, often followed by a paragraph cite
Declaration / Declared	The pre-flight list of flight-specific information required by SC3. When planned *Start*, *Turn* or *Finish* locations are included by name or coordinates, the task and those locations are often referred to as "declared"
MoP	A motorglider's Means of Propulsion
Duration	The elapsed time between the Start and Finish
Start	The beginning of the flight performance, not before the later of release or MoP stop
Turn Point[s]	One or up to three Way Points achieved after the *Start* and before the *Finish.*
Finish	The end of the flight performance, not later than the earlier of landing or MoP start
Task Type	A distance or speed performance defined in SC3 1.4.3 – 1.4.8.
Task Distance	The distance measured along course line, from *Start* to *Finish*, via *Turn Points* if any
Official Distance	The distance credited for a badge or record and the distance to be divided by duration to yield speed for a record performance.

I. PRELIMINARIES

A dry read, but important to success!

PERSONNEL & EQUIPMENT

Online Resources

SSA.org

Soaring Achievement and *Info & Resources* links access SSA's -

- FAQ
- Badge & Record Worksheet
- FAI Sporting Code ("SC3")
- SC3 Summary for Badges
- Rules for SSA awards

FAI.org/gliding

Documents, Technology and/or *Gliding Sport* links access -

- World Record applications
- Flight Recorder information & Approval Documents
- Current and historical lists of World Records

SC3 provides for individual countries to approve off-the-shelf GPS Position Recorders for recording Silver or Gold Badge flights. As of 15 May 2010, no such recorders have been approved for use in the US.

Official Observer ("OO") Qualifications:

For FAI Badges, State and US National Records, the OO must be an SSA member and (1) hold at least an SSA "B" badge; or be (2) the airport manager at the airport of takeoff or landing; or (3) an SSA appointee.

For World Records, the OO must meet the above requirements *AND* be SSA approved in writing to serve as an OO for World Records.

In all cases, the OO must be familiar with SC3, pre- and post-flight procedures for the data recording equipment used and accurate analysis of flight documentation

Data Recording & Basic Procedures

A Flight Recorder ("FR") is permitted for any badge or record flight

An FR is an electronic instrument approved by FAI's International Gliding Commission to record time, pressure data, GPS position, and - in the case of motor gliders - engine noise level. Check the FR's IGC Approval Document to make sure it's approved at the appropriate badge or record level and running the approved "firmware" version.

- Before flight, the Pilot and OO complete the pre-flight portion of an SSA Badge & Record Worksheet.
- In flight, the FR records data at regular intervals; as soon as possible after landing, an OO completes the post-flight portion of the SSA Badge & Record Worksheet, performs or supervises data file download, checks data file security and evaluates flight data.
- Independent evidence is required to verify take off and landing times and locations. This may take the form of soaring site flight logs or witness statements.

A Barograph is permitted for certain badge and State Record flights

A mechanical or electronic **barograph** tracks both elapsed time and pressure data. This is the only recording device required for any Badge altitude or duration claim and any Badge or State Record distance claimed from release to landing with no Turn Points.

- Before flight, the Pilot and OO complete the pre-flight portion of an SSA Badge & Record Worksheet.
- The barograph records in-flight pressure altitudes; as soon as possible after landing, an OO takes charge of the barograph and completes the post-flight portion of the SSA Badge & Record Worksheet.

DECLARATION REQUIREMENTS

A pre-flight declaration is required for all Badge and Record flights using either an IGC approved FR or an NAC-approved Position Recorder.

When a barograph alone is used to record a Badge flight for altitude gain, duration or straight distance flight from release to landing, an Official Observer's pre-flight ID mark must be on the barogram, but no pre-flight declaration is required.

Written declaration forms are available at SSA.org, both as a stand-alone document and incorporated into the Badge & Record Worksheet

For ANY FR and any flight other than a World Record attempt

For any flight other than a World Record, the pilot may use either a one-page written declaration or an electronic declaration entered in FR memory. World Records require the latter.

In either format, only the last declaration made before takeoff is valid for a given flight and per SC3 4.2.1 it must include –

a. **Date of flight**
b. **Pilot name *(and passenger name for multiplace records)***
c. ***Glider Type (make /model) and its registration or serial number**
d. **Make, model & serial # for each data recording device used**
e. **For a distance or speed claim: intended Start, Turn and Finish Points (This does not apply to straight distance badge task from release to landing or 'Free' records)**

By IGC ruling, an SSA-assigned contest number isn't acceptable, as it doesn't uniquely identify the aircraft flown.

When using a written declaration, the Observer must certify declaration date & time, so the following are required in addition to the above –

f. **Pilot in command signature**
g. **OO signature, with date & time**

By default, an IGC-approved FR includes declaration date & time in the data file, ***but FR models vary widely in how the time is assigned.***

The best procedure for a new FR user, a case where one FR is used in multiple aircraft or when pilot, aircraft or task data entered in an FR can't be checked for accuracy and changed if necessary before take off:

- **Prepare a written declaration ready for an OO's signature**
- **On the intended flight date, the OO performs a pre-flight FR installation check and the FR is turned on; a task may be entered if desired**
- ***The OO waits a few minutes, then adds his/her signature, date & time to the <u>written</u> declaration***
- **No further tinkering with FR task entry, and make sure the FR remains ON until after landing**

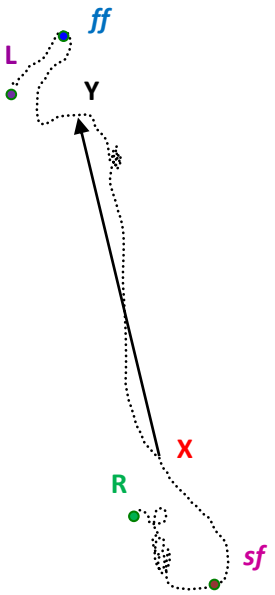
Do you transfer declarations to an FR using a PDA or after-market software? These may over-write data in FR memory and/or limit the number of characters transferred to any FR data field. Prior to attempting any badge or record flight, test to make sure all required data is correctly transferred to the FR; contact software vendor(s) for guidance if needed.

II. TASK OPTIONS

Who knew there were so many?!

DISTANCE TASKS WITHOUT TURN POINTS

ground track in free flight
course line as declared



SC3 1.4.3 Straight Distance *(Badge Distance only)*

No Turn Points are declared or no declared Turn Point is achieved. When documented by GPS, Task Distance at left is Rff - the longest of RY, XY, RL, XL, Rff and Xff, where…

R = release or MoP stop
X = the declared Start Point, if achieved
Y = the declared Finish Point, if achieved
ff = a Finish Fix selected post-flight and recorded before "L"
L = the earlier of landing or MoP start

NOTE: Straight Distance, with task distance RL, is the only badge-eligible task type available for flights documented by barograph alone.

SC3 1.4.4 Straight Distance to a Goal ***(Records Only)***

No Turn Points are declared. Task distance is XY, where…

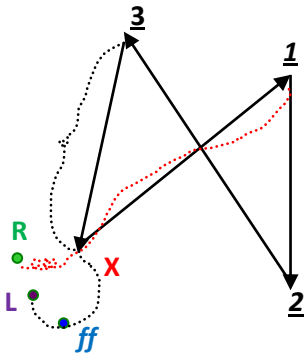
X = declared Start Point
Y = declared Finish Point
} *achieved by some combination of 1000-meter OZ Sector(s) and Start and Finish Line(s)*

SC3 1.4.7a Free Straight Distance ***(Records Only)***

Way Points may be selected post flight from GPS-recorded Fixes. In this case, Task Distance is measured from release or any later Start Fix (*sf*) to any Finish type. At left, task distance would be *sf* to *ff*.

DISTANCE TASKS WITH ONE OR MORE TURN POINTS

first leg ground track
last leg ground track
course line



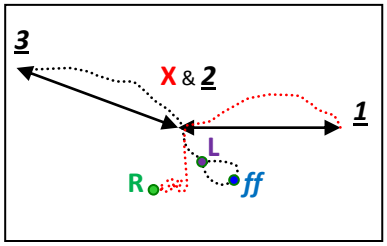
SC3 1.4.5 Distance Using Up to 3 Turn Points *(Badge or Record Distance)*

Same Start & Finish options as Straight Distance, but at least 1 of up to 3 declared Turn Points must be achieved; Turn Points are at least 10 km apart and may be used in any order. A declared Start and/or Finish Point may be used as a Turn Point if also declared as a Turn Point. Here…

R = release or MoP stop
X = the declared Start or Start/Finish Point, if achieved
1 2 3 = declared Turn Points, in the order achieved
ff = a Finish Fix recorded before "L" and selected post-flight
L = the earlier of landing or MoP start

With three Turn Points declared & achieved, task distance at left is R 1 2 3 ff

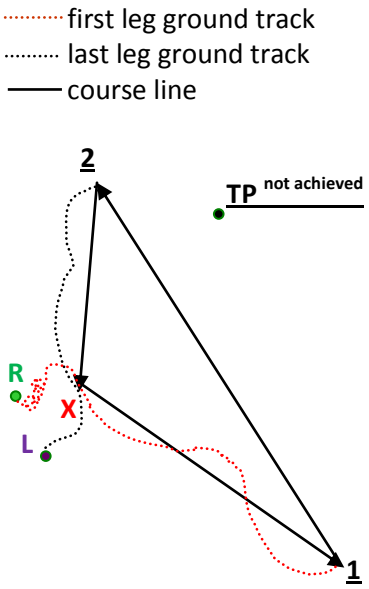
Note: *Concurrent tasks are also possible. See* ***SC3 1.4.7b, 1.4.6 & 1.4.8***



Variant 1: Start/Finish Point declared as one of three Turn Points

Essentially, this variant consists of back-to-back out & return legs. As shown, task ***Distance Using Up to 3 Turn Points*** *is R 1 2 3 ff. A finish at X would yield the best last leg if 1 was the last Turn Point achieved.*

Note: *A concurrent record task is also possible. See* ***SC3 1.4.7b***



SC3 1.4.5 Distance Using Up to 3 Turn Points *(Continued)*

***Variant 2:* One or more Turn Points isn't properly achieved, where…**

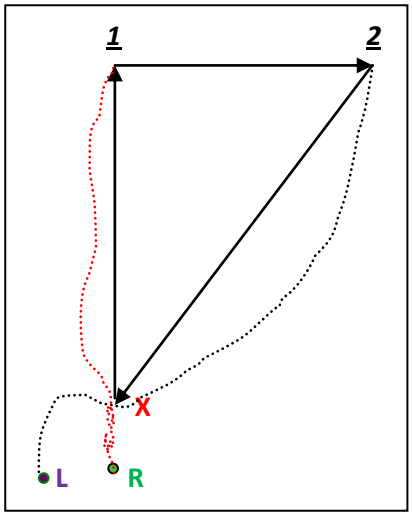
R = release or MoP stop
X = declared Start/Finish Point
1 2 = 2 of 3 declared Turn Points, in the order used
ff = a Finish Fix recorded before "L" and selected post-flight
L = the earlier of landing or MoP start

As shown at left, one skipped Turn Point and lack of an advantageous Finish Fix in this case mean task ***Distance Using Up to 3 Turn Points*** *is* R **1 2** L

Note 1: *If only one declared Turn Point were achieved, the task* ***Distance Using Up to 3 Turn Points*** *is* R *via the Turn Point achieved to* L

Note 2: *Though* X *may have been declared and achieved as a goal flight Start/Finish Point,* ***a skipped or improperly achieved Turn Point means the flight cannot be credited as Diamond Goal or a closed course record.***

Note 3: *Concurrent tasks are also possible; see* ***SC3 1.4.7b, 1.4.6 & 1.4.8***



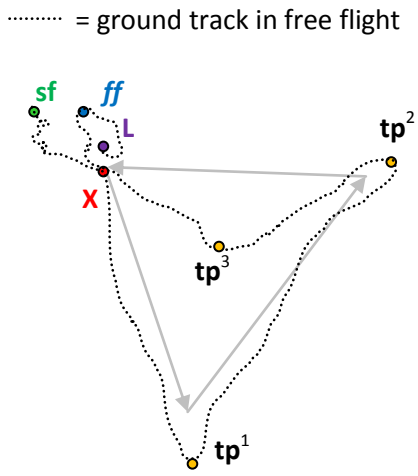
***Variant 3:* a Start/Finish Point and fewer than 3 Turn Points are declared and achieved in declared order, where…**

R = release or MoP stop
X = declared Start/Finish Point
1 2 = declared Turn Points, used in declared order
ff = a Finish Fix recorded before "L" and selected post-flight
L = the earlier of landing or MoP start

At left, given the release location and lack of a more advantageous Finish Fix, task **Distance Using Up to 3 Turn Points** is R **1 2** L.

Note 1: *If only one Turn Point were declared and achieved at left, the task* ***Distance Using Up to 3 Turn Points*** *would be* R ***TP*** L

Note 2: *Concurrent tasks are also possible; see* ***SC3 1.4.7b, 1.4.6 & 1.4.8***



SC3 1.4.7 b Free Distance Using Up to 3 Turn Points ***(Records only)***

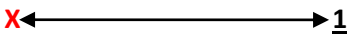
Similar to Distance Using Up to 3 Turn Points, but **Way Points may be selected post flight.** Task distance is measured from release or any later Start Fix (sf), via as many as 3 Turn Point Fixes in the order recorded (**tp**^{1}, **tp**^{2}, **tp**^{3}) to a Finish Fix (*ff*) recorded at or before the earlier of Landing or Motorglider MoP start.

Note 1: *as shown at left, a "Free" task may be based on a declared task – in this case, a triangle outlined in grey, with the declared Start/Finish at* X**.** *Claimed as* ***Free Distance Using Up to 3 Turn Points,*** *the best task distance would be* sf **tp**^{1} **tp**^{2} **tp**^{3} *ff. When a Fix is claimed as a Turn Point, there is no Cylinder Correction penalty, so Official Distance in this example would be task distance less any applicable Loss of Height penalty.*

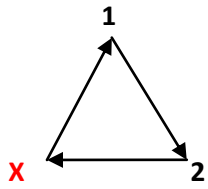
Note 2: *Concurrent tasks are also possible; see* ***SC3 1.4.6 & 1.4.8***

Ground track not shown

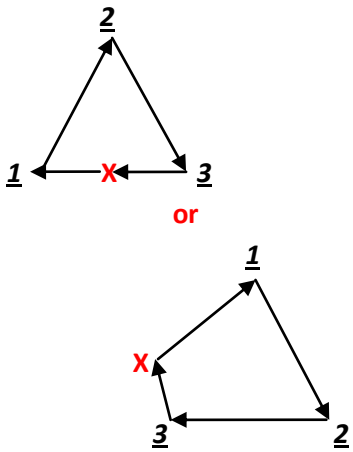
Badge or Record Out & Return
(Fig 1)



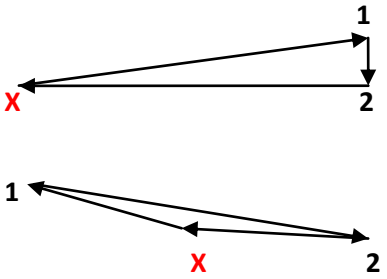
2-TP Badge / Record Triangle
(Fig 2)



3-TP Badge or Record Triangles
(Fig 3)



2-TP Triangles OK for Badges
(Fig 4)



3-TP Triangle OK for Badges
(Fig 5)

SC3 1.4.6 Closed Courses for Diamond Goal, Distance & Speed Records

A Start/Finish Point and 1, 2 or 3 Turn Points are declared and achieved in declared order. The Start & Finish *must* be achieved using any combination of 1000-meter radius OZ Sector(s) and Start/Finish Line(s), where…

X = declared Start/Finish Point
1 = *one* TP declared & achieved for an **Out & Return**
1 2 = *two* TPs declared & achieved for a **2-Turn Point Triangle**
1 2 3 = *three* TPs declared & achieved for a **3-Turn Point Triangle**

1.4.6 a: ***Out & Return*** *task distance is* **X 1 X** *(fig 1)*

1.4.6b(i): ***2-Turn Point Triange*** *task distance is* **X 1 2 X** *(fig 2, 4)*

1.4.6b(ii): ***3-Turn Point Triangle*** *is flown* **X 1 2 3 X** *but task distance is measured* **1 2 3 1**, *and OFFICIAL DISTANCE* must be at least 300 km. *(* **X *must be achieved*** *and may be anywhere; the farther from course line, the greater the distance flown without triangle distance credit.) (fig3, 5)*

Note 1 : *For ANY record triangle of 750 km or more, each LEG must be 25% to 45% of the OFFICIAL DISTANCE. For shorter record triangles, no LEG may have a length of less than 28% of the OFFICIAL DISTANCE.*

Note 2: *Leg length limits don't apply to Badge triangles, but if Turn Points are at least 10 km apart, the flight can still be credited as Distance Using Up to 3 Turn Points in the event the task isn't completed to closed course standards.*

SC3 1.4.8 Free Distance Closed Courses *(Distance records only)*

Way Points may be selected post flight. Task distance is measured from a *Start Fix* no earlier than the later of release or motorglider MoP stop to one or more subsequent *Turn Point Fixes* in the order recorded. To complete the task, the glider must enter a 1000-meter radius Finish OZ at the Start Fix or cross a Finish Line centered on the Start Fix.

In the graphics at left, X represents the selected *Start Fix*, which also defines the Finish OZ and Finish line; numbered Way Points are *Turn Point Fixes*.

1.4.8a Free Out & Return Distance A *Start Fix* and one *Turn Point Fix* are selected from recorded data. Free O & R task distance is **X 1 X** *(fig1)*

1.4.8b Free Triangle Distance A *Start Fix* and *Turn Point Fixes* are selected from recorded data. Free 2-Turn Point Triangle task distance is **X 1 2 X** *(fig 2)*; Free 3-Turn Point Triangle task distance is **1 2 3 1** *(fig 3)*.

Note 1: *When a Fix is claimed as a Free Turn Point, there is no Cylinder Correction penalty at that Turn Point.*

Note 2: *Free Triangles are subject to the same leg length requirements as listed above for declared Triangles*

III. PROCEDURAL ISSUES

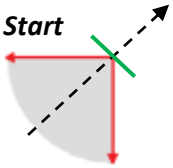
Details that can make or break a badge or record claim!

ACHIEVING WAY POINTS

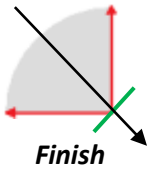
inbound course
outbound course
OZ boundary
Start/Finish Line

START & FINISH OPTIONS

Start



Start & Finish Lines are 1km long; Sector radius is 1 km for Goal flights, unlimited for others.

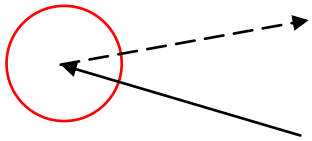


Finish

BEWARE! The order in which Turn Points are used changes the orientation of OZ Sectors!

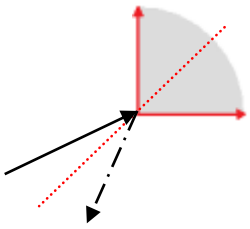
TURN POINT OPTIONS

CYLINDER OZ *500 meter radius*



SECTOR OZ *Unlimited radius*

Course bisector



A Start at Release or a Finish at landing may be certified by an Observer based on witness statements consistent with data recorded by barograph or GPS. Elsewhere, GPS data must clearly prove Way Points were achieved:

- ✓ A Start other than release and/or a Finish other than landing may be achieved by crossing a line 1 km long, centered on the Way Point. The Start Line is perpendicular to the first leg, the Finish Line is perpendicular to the last leg.
- ✓ At any Start or Finish Point not achieved by line crossing and at each Turn Point -

  (1) a Fix must be exactly on Way Point coordinates or within its Observation Zone; or

  (2) a straight line drawn between two consecutive valid fixes must cross the Observation Zone boundary

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SC3 1.2.5 OBSERVATION ZONE (OZ): The airspace a glider must enter to attain a Way Point. The OZ may be either a Cylinder or a Sector:

- SC3 1.3.6 CYLINDER OZ ***(Turn Points ONLY)*** The airspace within a vertical cylinder of 500 meter radius centered on the Turn Point.

OZ CORRECTION *Each time a course leg crosses a CYLINDER OZ boundary, 500 meters is subtracted from the length of that leg. This correction does not apply to Free Record Turn Points at GPS fixes.*

- SC3 1.3.8 OZ SECTOR ***(Any Way Point)*** The airspace above a quadrant having its apex at the WAY POINT. *Orientation and radius vary:*

- At a *Turn Point*, the OZ Sector is symmetrical to and remote from the bisector of the inbound & outbound LEGS at the TURN POINT. ***OZ Sector radius is unlimited***

- At a *Start Point* *(other than Release)*, the OZ Sector is symmetrical to and remote from the outbound LEG. ***OZ Sector radius is 1000 meters for goal & all closed course flights; it is unlimited for Straight Distance & Distance Using Up to 3 Turn Points***

- At a *Finish Point* *(other than Landing)*, the OZ Sector is symmetrical to and remote from the inbound LEG. ***OZ Sector radius is 1000 meters for goal & all closed course flights; it is unlimited for Straight Distance & Distance Using Up to 3 Turn Points***

LOSS OF HEIGHT LIMITS & PENALTIES

SC3 1.3.4 Loss of Height (LoH): Start Altitude minus Finish Altitude, *where…*

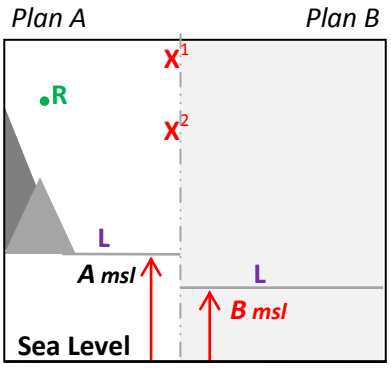
Start & Start Altitude MSL may be at

- Release or MoP stop, if claimed as the Start; *or*
- the lowest Fix in the Start OZ; *or*
- Start OZ exit; *or*
- the lowest Start Line crossing; or
- for a 'Free' record, a Start Fix

Finish &Finish Altitude MSL may be at

- the highest Finish Line Crossing; *or*
- Finish OZ entry; *or*
- the highest Fix in the Finish OZ; *or*
- a Finish Fix selected post-flight as the Finish; *or*
- pre-landing motorglider MoP Start; *or*
- landing site elevation, if landing is claimed as the Finish

Concurrent Badge and/or Record claims for a single flight may each use different Start & Finish options



As shown in side view at left, Plan A assumes a closed course using a Start/Finish Point at the home airport; in contingency Plan B, the glider lands out after achieving the Start and one or more Turn Points in the shaded area. In this case…

R = release or motorglider MoP stop in both plans
X^1 = Start/Finish Point achieved as a Start in both plans
X^2 = Start/Finish Point achieved as a Finish in Plan A
L = separate landing locations for each Plan

Finish Fixes for each plan can only be determined post-flight

NOTE 1: *Plan B's Finish by landing at* L ***increases*** *LoH relative to both release and the Start at* X^1. *A Finish Fix might come in handy…*

NOTE 2: *To avoid or minimize an LoH penalty…*

… *use* ***Maximum LoH*** *in the next section to plan Start Altitude, ideally -*

(Max LoH) + MSL elevation of the lowest landing site in the task area

… *for Straight Distance or Distance Using Up to 3 Turn Points, increase task distance* ***and*** ***Max LoH*** *with a Release on the "non-task" side of the Start Point, at or below maximum Start Altitude.*

Duration:
Maximum LoH = 1000 meters
= 3280.8399'

Release to landing yields longest **duration**, but given instrument and lag errors in altimeters, R should be planned no higher than 3000 feet *above landing site elevation*.

NOTE: *Tow a bit too high? Using GPS documentation, Silver Duration can be credited from Release to a Finish Fix recorded at least 5 hours later.*

Speed: *(Closed Course required)*
Maximum LoH = 1000 meters
= 3280.8399'

Last Start Line crossing to first Finish Line crossing yields best **speed**, but if this exceeds Max LoH, calculate *all* LoH possibilities using closed course Start & Finish OZ Sectors. *Use the same pair of Start & Finish alternatives to calculate both Loss of Height and time on course.*

Distance </= 100 km (62.14 sm)

Max LoH = 1% of task distance

= 52.80 x task distance in sm

For planning purposes, base task distance on declared Start, Turn and Finish Points; then, plan a Start altitude no more than:

(52.8 x task distance in sm) + lowest landing site elevation in the task area

NOTE 1: *To avoid an LoH penalty for Straight Distance or Distance Using Up to 3 Turn Points, release no higher than the planned Start Altitude while within the unlimited radius Start OZ Sector.*

NOTE 2: *If all else fails: during post-flight evaluation, check for a Finish Fix advantageous in terms of location and/or altitude – either one can remedy LoH woes for Straight Distance and Distance Using Up to 3 Turn Points.*

Distance > 100 km :

A distance penalty applies if LoH is greater than 1000 meters (3280.8399 feet)

On 100+ km flights where LoH exceeds 1000 meters, a penalty is deducted from task distance, and it's painful:

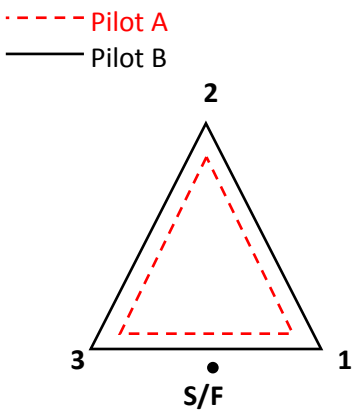
[(LoH – 3280.8) * 100] /5280

This amounts to 1.8939 sm for every 100' the LoH exceeds 1000 meters!

The strategies in Notes 1 and 2 above apply to Straight Distance and Distance Using Up to 3 Turn Points. For Goal and Closed Course tasks, the 1000-meter Start OZ radius means the best Start Point is a local landmark near a reliable lift area – easy to find and a safe place to record a low Start and, for a Closed Course, establish a high point if needed in the Finish OZ.

NOTE 1: *For Diamond Goal and other declared closed courses: If the Start or Finish wasn't properly achieved or an LoH penalty invalidates the closed course claim, distance may be credited as Distance Using Up to 3 Turn Points and/or a 'Free' Record.*

CYLINDER CORRECTIONS



Cylinder Corrections apply when a declared Turn Point is achieved by Cylinder OZ only, without entry into the Turn Point's OZ Sector.

In the 3-Turn Point triangle at left, Task Distance for both pilots would be **1-2-3-1**, but Pilot A - using Cylinders at all Turn Points - doesn't fly quite as far as Pilot B, who's used OZ Sectors. To level the playing field, a Cylinder Correction of 3 km (1.86 sm) would be deducted from Pilot A's Task Distance.

This is the worst case scenario for Pilot A, whose penalty is .5 km for every time the course line crosses a Cylinder boundary. **The whole course Cylinder Correction penalty subtracted from Task Distance amounts to 1 km for each declared Turn Point achieved only by Cylinder OZ.**

For Triangle distance and/or speed Records, Cylinder Corrections are more complicated due to the leg length requirements at SC3 1.4.6, which apply equally to declared and 'Free' Triangle courses.

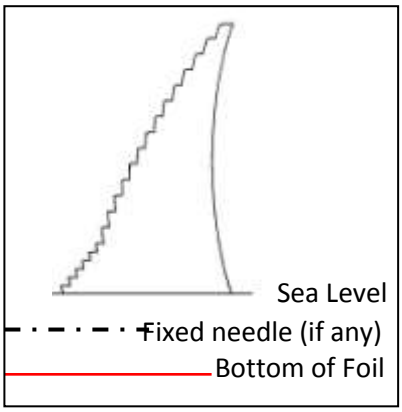
IV. POST-FLIGHT EVALUATION

A calculator may come in handy, especially for FR claims…

ALTITUDE CALCULATIONS – STEP 1: Correct for instrument error

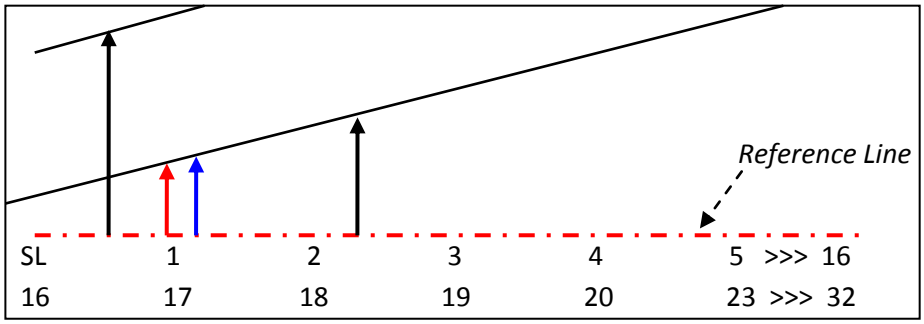
Mechanical Barographs Use Graphic Analysis

*A calibration **barogram** shows needle deflection at lab-induced pressure altitudes MSL:*



*The "steps" are plotted on a graph, above a reference line shown on EVERY barogram. See **SC3 Annex C, Appendix 5** for details.*

Use calipers to measure from the reference line on the flight barogram to its **pre-flight baseline**. Transfer this measurement to the calibration graph, and read calibrated altitude from the numbers below the graph's reference line. Repeat for key in-flight events and the **post-flight baseline**.



*In the example above, Take off & Landing site elevation is **1000' MSL** and:*

Pre-flight baseline:	**900**' MSL	**Post-flight baseline:**	**1,100**' MSL
Release & low	**2,200**' MSL	**High Point:**	**16,500'** MSL

Electronic Barographs & FRs Use Numeric Analysis

Numeric calibration compares true and indicated altitudes MSL, typically at intervals of 2 to 3 thousand feet:

True	Indicated
0	98
2000	2100
4000	4133
6000	6102

Use linear interpolation to correct for instrument error between known values. Shown below: at a landing site elevation of 798' MSL, **492'** is the FR-recorded post-flight pressure altitude and **X** is the equivalent calibrated altitude to be determined. *This is a real example from SSA files:*

True	Indicated
0	*98*
X	**492**
2000	*2100*

X = 2000 - ((*2100* - 492) * ((2000 - 0) / (*2100* - *98*))) = 393.6 feet

ALL ALTITUDE CALCULATIONS Step 2: Correct for Non-standard Pressure

*Why? Because the FR or barograph does **exactly** what your altimeter does, but it can't be reset before or in flight*

A = Takeoff site elevation minus *calibrated* altitude at the pre-flight baseline

(A negative number may result)

B = Landing site elevation minus *calibrated* altitude at the post-flight baseline

(A negative number may result)

For each event near take off time, *ADD "A" to its calibrated altitude*.

In the barograph example above, calculated altitude at the release/low point would be 2200 + (-100) = 2100' MSL

For each event near landing time, *ADD "B" to its calibrated altitude*.

In the barograph example above, calculated altitude at the high point would be 16,500 + (100) = 17,500' MSL

*In the FR example above, calculated altitude MSL at any event recorded near landing time would be its calibrated altitude **plus** 404.4 feet.*

DETERMINING OFFICIAL DISTANCE & TRIANGLE ELIGIBILITY

STEP 1.

Calculate Official Distance

This is both…

- *the Badge or Record distance credited for the task(s) claimed*
- *the distance used to calculate Record speed*

Check first for completion of the task declared, then check for task variants that may yield concurrent claims. *(Common: a Closed Course Badge or record distance or speed task also yields a longer Distance Using Up to 3 Turn Points and/or a still longer 'Free' record.)*

For each task variant, determine whether LoH and/or Cylinder Correction penalties apply. If so…

Official Distance = Task Distance – (LoH penalty + Cylinder Corrections)

STEP 2.

Verify eligibility for Triangle distance and/or speed records

Step 1: *if Official Distance includes any Cylinder Correction penalty, use the table at right to deduct the proper Correction from each triangle leg*

Step 2: *compare leg lengths (corrected as needed) to the following limits:*

- ***Official Distance < 750 km:***
  Each leg is at least 28% of Official Distance
- ***Official Distance > 750 km:***
  No leg is less than 25% or more than 45% of Official Distance

Turn Point(s) using Cylinder OZs

1 TP Task

	1 of 1
Leg 1	*0.5*
Leg 2	*0.5*
Course	1

TP achieved by Cylinder
leg corrections (km)
Course Correction (km)

2 TP Task

	1st only	2nd only	Both
Leg 1	*0.5*	*0*	*0.5*
Leg 2	*0.5*	*0.5*	*1*
Leg 3	*0*	*0.5*	*0.5*
Course	1	1	2

.5 km = .3107 sm 2 km = 1.2428 sm
1 km = .6214 sm 3 km = 1.8642 sm

Distance Using Up to 3 TP

	1st only	2nd only	3rd only	1st & 2nd	2nd & 3rd	1st & 3rd	All 3
Leg 1	*0.5*	*0*	*0*	*0.5*	*0*	*0.5*	*0.5*
Leg 2	*0.5*	*0.5*	*0*	*1*	*0.5*	*0.5*	*1*
Leg 3	*0*	*0.5*	*0.5*	*0.5*	*1*	*0.5*	*1*
Leg 4	*0*	*0*	*0.5*	*0*	*0.5*	*0.5*	*0.5*
Course	1	1	1	2	2	2	3

3 TP Triangle

	1st only	2nd only	3rd only	1st & 2nd	2nd & 3rd	1st & 3rd	All 3
Leg 1	*0.5*	*0*	*0.5*	*1*	*0.5*	*0.5*	*1*
Leg 2	*0.5*	*0.5*	*0*	*0.5*	*1*	*0.5*	*1*
Leg 3	*0*	*0.5*	*0.5*	*0.5*	*0.5*	*1*	*1*
Course	1	1	1	2	2	2	3

APPENDIX I. Useful Information

A. Metric/English Conversion, where 1 inch = exactly 2.54 centimeters

Badges & World Records		State & US National Records	
Altitude units = meters	1 m = 3.2808399 feet	Altitude units = feet	1 ft = 0.3048 m
Distance units = kilometers	1 km = 3280.8399 feet = 0.6214 sm	Distance units = statute mile	1 sm = 5280 feet = 1.6093 km
Speed units = km per hour		Speed units = miles per hour	

B. Distance measurement uses the WGS 84 ellipsoid earth model. The length of each course leg should be calculated using the FAI Distance Calculator available for download at: http://www.fai.org/distance_calculation/

C. Using FR Evaluation Software

1. Preferred Settings *Names & access points vary with software brand; those below refer to See You*

UTC Offset set to zero *select "Edit", and "Flight Properties" to reset*

Altitude reference "QNE" 1013.25 mb *select "Edit", and "Flight Properties" to reset*

Distance Calculation "using WGS 84 ellipsoid" *select "Tools" , "Options" and "General" to reset*
(Set altitude units to meters to coincide with FR-recorded data and set distance units to km. At the end of the evaluation process, use a single conversion to feet & statute miles if desired.)

Turn Point Observation Zones *select "Tools", "Options" and "Observation Zone" to set up and select frequently needed combinations:*

Way Point	Flight Type	*OZ Type*	Size (extending from Way Point) & settings
Start	Goal or Closed Course	*Sector*	1 km radius; "To next Point" & "Angle 1 = 45"
Start	Goal or Closed Course	*Line only*	.5 km; "To next Point" & "Line Only"
Start	*Not* goal or closed course	*Sector*	*user selected; "To next Point" & "Angle 1 = 45"
Turn Point	Any flight	*Sector*	*user selected; "Symmetrical" & "Angle 1 = 45"
Turn Point	Any flight	*Cylinder*	**.5 km; "Symmetrical" & "reduce leg distance"
Finish Point	Goal or Closed Course	*Sector*	1 km radius; "To Previous Point" & "Angle 1 = 45"
Finish Point	Goal or Closed Course	*Line Only*	.5 km; "To Previous Point" & "Line Only"
Finish Point	*Not* Goal or closed course	*Sector*	*user selected; "To Previous Point" & "Angle 1 = 45"

* FAI Sector radius is unlimited, but a 3 to 5 km radius is workable for most claims; re-set to a larger radius if necessary
** using the "reduce leg distance" option, task distance displayed in statistics will include the cylinder correction

2. ISSUES TO NOTE: *The Electronic Age is upon us and evaluation software is wonderful stuff, but…*

- **DON'T** archive data files at OLC. Downloads from OLC won't pass the security check required for Badges & Records.
- **ALWAYS** use overhead and altitude graphics to check software-stated release time! (It may misinterpret a change in rate of climb as a winch launch release or overlook the change in turn radius typical of an aero-tow release.)
- Evaluation software may display interpolated positions between recorded fixes and/or altitudes other than those actually recorded. To double-check a particular fix, open a copy of the original data file in "Notepad" or similar. The "B" records are fixes and each looks like this, with the "A" denoting valid position data:

  B170612391950 8N12007877WA01679*01790* … other info varies with FR model

  UTC Time Latitude (N or S) Longitude (E or W) Pressure Altitude *Satellite Altitude…*

- The above issue is common at the Start/Finish Point for an "Optimized" 'Free' Triangle; manual review is needed to find a recorded Start Fix in compliance with SC3 and, for a 2-Turn Point Triangle, determine triangle leg lengths.

APPENDIX II: Sample Evaluation Guide

I. ALL CLAIMS *timely submission of the application and -*

_____ On the application or separately, the pilot certifies the flight was conducted in compliance with the FAI Sporting Code, glider operating limitations and flight regulations respecting airspace use, night flight, etc. per SC3 5.3.2a

_____ Any GPS recorder: the instrument is properly approved, running current "firmware" and the data file passes Security

_____ Any Mechanical Barograph: ALL items required by SC3 5.3.3 are written on the barogram

_____ Release (and motorglider MoP status, if applicable) is/are clearly evident in recorded data

_____ FR or barograph calibration is current per SC3 4.4.4

_____Key altitudes have been corrected for both instrument error and non-standard pressure.

_____ A pre-flight declaration was made as required by SC3 4.2 and, if distance is claimed on the basis of declared Way Points, the declaration lists a total of no more than 5: Start, Finish and a maximum of 3 Turn Points

_____ Task distance is based on the WGS 84 ellipsoid, using the FAI World Distance Calculator or equivalent.

II. ALTITUDE CLAIMS The pressure correction outlined at page 9 is adequate for most claims. If a key altitude was achieved remote from takeoff and landing locations in terms of time and/or distance, SSA bases pressure correction on the best available METAR, adjusted per ICAO tables. Contact thebadgelady@ssa.org for help in making such an analysis if needed.

III. DURATION CLAIMS Duration from any Start to any Finish is at least 5 hours, with a Loss of Height of less than 3280.8 feet.

IV. DISTANCE AND SPEED CLAIMS

A. CLAIM TYPES. *Given SC3 1.4.1a and 1.4.3 through 1.4.8, one flight may yield as many as six distance record claims (one in each whole numbered section below) and a declared closed course may yield multiple speed record claims.*

____1. ***Straight Distance (Badge)*** *or* ***Distance Using Up to 3 Turn Points (Badge or Record)*** Check Start & Finish options and LoH alternatives to find the best Task Distance with minimal LoH penalty. For *this* combination:

1.1 TASK DISTANCE: Straight Distance or **Distance Using Up to 3 Turn Points:** _____ km

1.2 Loss of Height *(Start Altitude minus Finish Altitude)* **=** _____ feet

1.3 Distance Using Up to 3 Turn Points: Number of Turn Points achieved only by OZ Cylinder: _____

____ 2. ***Free Straight Distance (Record).*** *Select Start & Finish Fixes to minimize any Loss of Height penalty.*

2.1 TASK DISTANCE: Free Straight Distance: _____ km

2.2 Loss of Height *(Altitude at the Start Fix minus Altitude at the Finish Fix)* **=** _____ feet

____ 3. ***Free Distance Using Up to 3 Turn Points (Record).*** *Selection of Start & Finish Fixes can minimize any Loss of Height penalty; selection of Turn Point Fixes eliminates Cylinder Correction.*

3.1 BEST TASK DISTANCE: Free Distance Using Up to 3 Turn Points: _____ km

3.2 Loss of Height *(Altitude at the Start Fix minus Altitude at the Finish Fix)* **=** _____ feet

____ 4. Straight Distance to a Goal (Record) or **Declared Closed Course Distance (Badge or Record) and/or Closed Course Speed (Record).** Bearing in mind that Start & Finish Sector OZ radius is 1 km (.6214 sm) for these tasks, determine which Loss of Height alternative below minimizes Loss of Height. *These are listed in typical order of significance to a speed claim*

____ a. Start Line to Finish Line ____ d. Start OZ exit to Finish OZ entry ____ g. Low in Start OZ to Finish Line

____ b. Start Line to Finish OZ entry ____ e. Start Line to high in Finish OZ ____ h. Low in Start OZ to Finish OZ entry

____ c. Start OZ exit to Finish Line ____ f. Start OZ exit to high in Finish OZ ____ i. Low in Start OZ to high in Finish OZ

4.1 TASK DISTANCE via declared Way Points: _____km ***(TP1-TP2-TP3-TP1 for a 3-TP triangle)***

4.2 Loss of Height for the Start/Finish alternative selected above : _____ feet

4.3 Number of declared Turn Points achieved by Cylinder OZ only: _____

4.4 SPEED CLAIMS: Duration, using the selected Start & Finish alternatives: _____*HH:mm:ss*

Duration in seconds: ***[(hours* 3600) + (minutes*60) + (seconds)]*** *=* _____

____ 5. ***Free Out & Return Distance (Record).*** *Selection of the Turn Point Fix eliminates any Cylinder correction.*

Select one:

_____ *a declared Start/Finish Point is claimed; the best alternative listed in 4a through 4i is:* _____

_____ *a Start Fix is claimed and marks the center of the Finish Line and the apex of the Finish OZ Sector, which has listea radius of 1 km (.6214 sm); the best alternative to minimize Loss of Height is:*

____ a. Start Fix to Finish Line Crossing ____ b. Start Fix to Finish OZ entry ___ c. Start Fix to high in Finish OZ

5.1 TASK DISTANCE: Free Out & Return: _____km

5.2 Loss of Height for the Start/Finish alternative selected above: _____ feet

____ 6. ***Free Triangle Distance (Record).*** *Selection of Way Point Fixes eliminates any OZ Cylinder Corrections, but may not provide compliance with the leg length minima of SC3 1.4.6.*

Select one:

_____ *a declared Start/Finish Point is claimed; the best alternative listed in 4a through 4i is:* _____

_____ *a Start Fix is claimed and marks the center of the Finish Line and the apex of the Finish OZ Sector, which has a radius of 1 km (.6214 sm); the best alternative to minimize Loss of Height is:*

____ a. Start Fix to Finish Line Crossing ____ b. Start Fix to Finish OZ entry ___ c. Start Fix to high in Finish OZ

Select one:

_____ *All Turn Points claimed are Fixes selected post-flight*

_____ *One or more Turn Points are claimed on the basis of a pre-flight declaration*

6.1 TASK DISTANCE using the Way Points claimed: Free Triangle: _____km

6.2 Loss of Height for the Start/Finish alternative selected: _____ feet

6.3 Number of declared Turn Points claimed and achieved by Cylinder OZ only: _____

B. CALCULATIONS FOR <u>EACH</u> DISTANCE OR SPEED CLAIM

✓ **1. Loss of Height Penalties**

a. Claim invalidation where either (1) Duration or Speed claim LoH exceeds 1000 meters (3280.8399 feet); or (2) Distance claim Task Distance is 100 km or less and LoH exceeds 1% of the task distance

b. The following penalty applies where Task Distance exceeds 100 km and LoH exceeds 3280.8399 feet:

(LoH - 3280.8399)*100 , divided by 3280.8399 = [ ] = *LoH penalty in km*

✓ **2. Cylinder Correction(s)** *Applies to 'Free' tasks only at a declared Turn Point claimed in lieu of a Turn Point Fix*

Number of Turn Points achieved by Cylinder only = [ ] *Total Cylinder Correction in km*

✓ **3. Official Distance & Speed**

a. Badge or World Record Distance = (Task Distance) **–** *(sum of boxes above)* = _____ km

b. State or US National Record Distance = *the number in 3a *3280.8399, divided by 5280* = _____ sm

c. World Record Speed = *(3a, divided by duration in seconds) *3600* = _____ km/hr

d. State or US National Speed = *(3b, divided by duration in seconds) * 3600* = _____ mph

✓ **4. Triangle Record Eligibility**: *Applies to Distance and Speed records only, not Diamond Goal or any other Badge claim*
Refer to the table at page 10, apply Cylinder Correction (if any) to each task leg and confirm:

If Official Distance is <= 750 km, *each corrected leg is at least 28% of Official Distance.*

If Official Distance is > 750 km, *no corrected leg is less than 25% or more than 45% of Official Distance*

APPENDIX III: Appeal Procedures

1.0 General procedures

1.1 When a claim for FAI Badges, National or World Record or SSA flight Award is denied, the SSA's FAI Awards Secretary will notify the pilot by letter *or e-mail*. If the pilot chooses to contest the denial, the pilot's written *or e-mailed* appeal must be postmarked to the SSA *or e-mailed to* thebadgelady@ssa.org within 30 days of the postmark *or e-mail send* date of the FAI Awards Secretary's denial. When the appeal involves the denial of a National or World Record, the SSA FAI Awards Secretary shall immediately advise the NAA and the FAI if applicable to request an extension of the filing deadline.

1.2 The pilot's Appeal must include the reason(s) for seeking review. The pilot may also provide supporting documents and statements signed by one or more Official Observers or other witnesses familiar with the circumstances of the flight in question. *For appeals submitted by e-mail, such documents must be scanned and sent as attachments.* After this submission, no further evidence will be accepted or considered. *If not submitted by e-mail,* the pilot's appeal must be sent to the SSA either by U.S. mail or commercial delivery in a mailer that must indicate ATTN: FLIGHT CLAIM APPEAL.

1.3 The pilot's appeal will be "de-identified," with all names of people and places changed to generic equivalents (eg: the pilot's name is replaced by "Pilot," the Official Observer is "OO", and place names are replaced by "Take-off Site, Turnpoint, Landing Site")

1.4 De-identified appeals are forwarded to the SSA FAI Badge and Record Committee. The committee will render a decision within *(a)* 60 days of the of the postmark date of the FAI Awards Secretary's letter of denial; *or (2) 60 days of the send date on the FAI Awards Secretary's e-mail of denial, as applicable.*

2.0 Procedures for State Records

2.1 When a State Record claim is filed independent of an FAI Badge, National or World Record or SSA Flight Award Claim, documentation is submitted to and reviewed by the State Record Keeper. In the event of denial, the Record Keeper will notify the pilot by letter *or e-mail*.

2.2 If the pilot chooses to contest the State Record Keeper's denial, the pilot's written *or e-mailed* appeal must be postmarked to the SSA Badge and Record Committee Chair *or e-mailed to the SSA Badge and Record Committee Chair* within 30 days of the postmarked date *or e-mail send date* of the State Record Keeper's denial. The pilot's appeal then proceeds as in 1.2 through 1.4 above with the exception that the appeal is sent to the FAI Badge and Record Committee Chair.

3.0 Further Review of Committee Findings (All flights)

3.1 Consistent with the FAI Sporting Code, General Section, Chapter 9, the Committee decision rendered in 1.4 above is the "announcement" of claim denial.

NOTE: From this point onward, the SSA Board or its Executive Committee may prefer original hard copy appeal documents rather than e-mail. Please inquire by contacting chairman@ssa.org.

3.2 If the pilot wishes to contest the Committee decision, the pilot must notify the SSA by letter postmarked within 15 days of the postmark date on the letter *or the send date on the e-mail* announcing the SSA FAI Badge and Record Committee's decision.

This appeal should be addressed to the SSA Board of Directors. The SSA Board of Directors (or appointees acting on their behalf) will review the issue within 60 days of the postmark date of the pilot's appeal to the Board. If no decision is forthcoming after 60 days, the decision of the Badge and Record Committee shall be considered final.

3.2.1 For SSA Flight Awards, State and National Record claims, the Board's ruling is final

3.2.2 For FAI Badge or World Record claims, the Board will decide whether to pursue the FAI appeal process outlined in the FAI Sporting Code, General Section, Chapter 9, and:

- if the Board decides not to pursue an appeal to FAI, that decision is final.

- If the Board decides to pursue an appeal to FAI, coordination with the NAA is required (9.1); a monetary deposit is required (9.2) and FAI-calculated Tribunal fees may be assessed (9.4.2). The Board may hold the pilot responsible to pay some or all of the FAI-levied appeal costs and fees.

The Committee was not developed to become involved in the day to day operations of the SSA Staff but can be consulted on matters requiring clarification by Staff.