VIRTUAL AIR RACE CHAMPIONSIP

Introduction
It is like the Red Bull Air Race competition, it is an analog to real event. If you`ve never heard about it, for first meet you can check out the following link to a video:https://www.youtube.com/watch?v=XZeBE9ttUzY

Okay, what is this about? Let`s look at our virtual skies. See? I dont see any of sporting events. But why? I was thinking about the reason a lot and didn`t find it. It is not so difficult to realize the project believe me. Well, let`s call it "aviation sport". Aviation sport is a totally new way for flight simulators. I have some experience in games and I understand that emotions and feelings, impressions - the major point, all games is created on this base. And you can ask a question: what does bring the most powerful impressions, emotions, feelings? The battle. Ofcourse this way we can`t talk about all people, but mostly. Battle or sport - there is a some interesting moment which is called "competition", when one person fights with another person. Im not going to propagandize this or something, Im just telling what everybody in games industry already knows. For example, the most popular games now are all created on this base - to give people a chance to challenge and to win. But if we look at flight simulator world we cannot see anything about this stuff. Thats why flight simulators is boring for many persons. This way Im not going to change a world or something, I just want to realize, to create something what will be really interesting.

Some guys asked me how do I see it at the end. Well, perfectly this project will be one of air sporting discipline of first in the history of flight simulators virtual air sport federation or something like that. For more, this competition as itself will be a real virtual show with live stream and maybe sponsorship. But I don`t want to go deep in that now.

Rules of competition.

- General

To understand the base let`s take a look at RBAR principles:
"The Red Bull Air Race World Championship is an international series of races. The objective is to navigate an aerial race track featuring air-filled pylons in the fastest possible time incurring as few penalties as possible. Pilots can win World Championship points at each race and the one with the most points after the last race of the season becomes the Red Bull Air Race World Champion".

- There are a several numbers of race tracks in season. Perfectly I would like to see 10 race tracks or more per season.
- I believe this project is about European Championship for first. It cannot be World Championship because of the huge time difference between Europe countries and America, between Europe and Asia but I`m not going into details.
- Would you like to call it "CIX Air Race European Championship"? Go ahead, why not? It doesn`t matter for me personally.
- Would I like to stream this event and so forth? Not at the beginning, I believe this project has to progress step by step from base to final form. By the way, this event is so hot so pilots will record

and upload videos of their participation by self.
- Is this project a full analog to real event? No. It is a virtual world, virtual project. So basically yes, it is an analog, but in details we could and in some cases we must change or better to say adapt some rules in dependence of situation. This way I`m going to introduce exactly virtual model of event.

- Race track

The total length of the race track according to real-world rules is 5-6 kilometers (3-4 miles). Race track consists of a series pylon pairs known as "Air Gates". Pilots must fly the race track through the Air Gates in a predefined order and the way as follows:
- Level (horizontal) flying through the start Air Gate (black and white chequered). This Air Gate is also used during the race and the finish gate - for this cases level flying is not mandatory.
- Level flying through Air Gates marked in blue.
- Knife (vertical) flying through Air Gates marked in red.
- Slalom flying through the Chicane (marked in red). The Chicane consists of two or more single pylons (usually three) positioned in line. Knife or level flying is not mandatory, pilots choose to fly narrow or wide through them.
- Knife flying through the Quadro (marked in red). The Quadro consists of four pylons positioned in a square. The point of flying through the Quadro is a turn of 270 degrees.

According to the real-world rules the dimension as follows:
- Each Air Gate is 20 meters (65 feet) high.
- The gap between the pylons in the Knife Air Gates is 10 meters (33 feet).
- The gap between the pylons in the Level Air Gates is 13 meters (42 feet).
- The gap between the pylons in the Chicane is 110 meters (360 feet).
The rules of the real RBAR competition is always moving and changing so I believe these parameters might be changed. The dimensions of Air Gates depend of an aircraft dimension, in this example the wingspan of an aircraft is 8 meters or 26 feet to use.

- Race format

Real and virtual race formats are not the same thing but similar.
There are a following flying sessions: Training, Qualifying, Wild Card, Race Day (Top 20), Top 12, Super 8 and Final.
- Training. It is a free session, pilots can practice the race when he wants. This is the only session that doesn`t need a special software. Official training session is one week as minimum.
- Qualifying. It is a weekly session before the Race Day. Pilots can qualify on a day they want during this week. Pilots pass the race track using special software two times only. Best time counts. Pilots with best 16 times proceed to the next round - Race Day (Top 20). Qualifying session is closing at 0000Z of Race Day. There is no mandatory about Race Director.
- Wild Card takes place on Race Day. Pilots with times from 17th to 25th positions compete for the 4 available places in the Race Day Start List (Top 20). Session starts from 0000Z of Race Day (after the software will finish operations with qualifying results and give an access to pilots for a wild card session) and closes at least an hour before the main competition starts. There is no

mandatory about Race Director.
- Race Day (Top 20). The fastest 12 pilots proceed to the next round - Top 12.
- Top 12. The fastest 8 pilots proceed to the next round - Super 8.
- Super 8. The fastest 4 pilots proceed to the next round - Final.
- Final. Best 4 pilots compete for the 1st, 2nd, 3rd and 4th place.

General view of break between race days: RACE DAY (Saturday or Sunday) - ONE WEEK TRAINING - ONE WEEK QUALIFICATION - RACE DAY (Saturday or Sunday). This way we have 2 races per month schedule, so if championship includes 10 race tracks, the whole event will take 5 month. It is a pretty much and good enough to call every championship by year like, for example: CIX Air Race European Championship 2013.

The Top 20, Top 12, Super 8 and Final sessions are have to be held online on some network, for example: on VATSIM.

- Championship points

The points are awarded after each race and will decide the European Champion at the end of the season. The point system as follows:
Qualifying:
1st place - 1 point.
The Race:
1st place - 12 points.
2nd place - 10 points.
3rd place - 9 points.
4th place - 8 points.
5th place - 7 points.
6th place - 6 points.
7th place - 5 points.
8th place - 4 points.
9th place - 3 points.
10th place - 2 points.
11th place - 1 point.
12th-20th places - 0 points.

- Timing

The timing is activated when the race plane (pilot) crosses the start line (start Air Gate) and is stopped when he passes the finish line (finish Air Gate). The result includes penalty time.

- Penalties and disqualification

The penalties can be added to the pilot`s time as follows:
- Incorrect Level Flying (2 seconds). Flying through the Gate exceeding the described angle of bank (more than 15 degrees).
- Incorrect Knife Flying (2 seconds). Flying through the Gate exceeding the described angle of bank

(more than 15 degrees) or wrong side (the pilot did left knife when should right knife).
- Too high (2 seconds).
- Exceeding the maximum entry speed (2 seconds). The maximum entry speed is 370 kilometers per hour. Penalty is given when entry speed is 371-380 kilometers per hour.
- Touching a gate (6 seconds). When pilot crashes one of the pylon.
it is a new system of penalties. Well, I believe we have to start with old system where were 10 seconds for touching and 3 seconds for others. RBAR was reduced the penalties because of professional level of flying and pilots. So this way we have to adapt under our skill level. I suggest to start with more huge penalties.

Disqualification (DSQ).
I don`t think we have to follow the all real-world rules of disqualification. So that`s what will work for us:
- Flying too low. When pilot flies through the Air Gate too low.
- Not flying the track. When pilot flies wrong order like he goes to the 3rd Gate after 1st.
- Exceeding the entry speed (pilot`s speed is 381 km/h or more).
- More than 3 times touching a gate. When pilot crashes 4 or more pylons.
- DSC by Race Director. Manual disqualification for breaking discipline, for example: pilot is a freak and disturbs other pilots. This way the pilot also can be disconnected from the network by Race Director if he has that power or by Supervisor in report from Race Director.

Did not start (DNS).
The status is given by Race Director manually when the pilot is late or not come to the event or race leg (session).

Did not finish (DNF).
The status is given by Race Director manually when the pilot is not going to finish the race track by his own decision. This decision must be reported to the Race Director.

- Operations and phraseology

There are Race Director and ATC of the aerodrome. The point of separation is a silence on the Race Director`s frequency during flying the race track.
There are at least two holdings for planes, one of them is entry holding whereas the second one is exit. Let`s take a look how that works:
ATC: Number one, Steven, Airfield Tower.
P1: Number one with you.
ATC: Number one, you`re the first to go, are you ready?
P1: Affirm, number one.
ATC: Number one, taxi holding point alfa.
P1: taxi alfa, number one.
ATC: number sixty two, Mike, Airfield Tower.
P62: number sixty two.
ATC: number sixty two, you are the second, are you ready?

P62: affirm, Im ready, sixty two.
ATC: sixty two, taxi to holding point alfa is approved in two minutes.
P62: copy that, in two minutes to holding point alfa.
P1: number one, ready to go.
ATC: number one, cleared for take-off wind bla bla bla, after departure proceed hold one, Race Director on 123.450
P1: cleared for take-off, hold one, 123450. number one.
P1: Race Director, number one to hold one. (only first pilot reports to Race Director)
RD: number one, cleared into the track.
P1: cleared.
P62: sixty two, ready to go.
ATC: sixty two, cleared for take-off bla bla bla, proceed to hold one, Race Director on bla bla bla.
P62: (readback)

*After departure when Pilot 62 goes on frequency of Race Director he doesn`t report, he just proceed to hold one. Race Director see the plane in hold and will call for pilot.

ATC: number twenty five, airfield tower.
P25: twenty five with you, ready to go.
ATC: twenty five, roger, taxi to holding point alfa in two minutes.
P25, in two minutes to alfa, twenty five.
P1: number one, finished.
RD: number one, cleared to hold two, contact tower on 133.565
P1: hold two and tower on 133.565, number one.
RD: number sixty two, Race Director.
P62: sixty two, ready to go.
RD: sixty two, cleared into the track.
P62: cleared.
P1: Airfield Tower, number one, hold two.
ATC: number one, join downwind runway bla bla bla ...

I hope this example shows the basic idea of operations, timing and phraseology. Of course this stuff can be mulled.

Pilots

- Participating

Every interested pilot can take a participate in upcoming event. This means that there isn`t closing registrations to the whole championship like "if you will not register till 1st of September, you will miss this championship" - I don`t want this. I prefer every pilot can join the championship on any leg, any race.

- Aircraft

It is interesting moment and I don`t have only one view about this. Well, maybe it will be a list of

aircrafts which is allowed. Of course it must be a small GA aircraft, sporting in a prior, with propeller type of engine, reactive engines are not permitted.
Aircrafts for the competition I know:
Edge 540 - freeware somewhere on the internet.
Extra 300 - freeware as default and payware by Alabeo.

- Weather and hacking

Well, the weather is a pretty difficult moment of this project. We can`t force all pilots to use the same weather because in this case they have to use the same weather software. Maybe we can control this moment, maybe not, it is needed to talk with programmer. Well, if we can`t handle this moment then there will not be a mandatory for using weather. This is a minus, a lack if it`s correct to say of this project. Let me explain why: if pilots may download any weather they want that means they can set up a calm. No wind affects to the way of flying and to speed, because the entry speed limit is not an indicated speed, it is a ground speed including wind. That`s why it is not so good if we can`t handle the weather pilots use, but I don`t actually how to solve this moment.
Hacking. Everybody understand as competition it is very important to be well protected from hacking. Well, I thought a lot and I see only one moment: pilots can replace an aircraft type in aircraft config. What does that means? It means that I can fly on Cessna 172 but the competition software will read me as Extra 300 plane. But this moment isn`t serious, let`s look at it closer:
- Pilot replace config from Extra to Cessna 172 or Piper or Sirrus or another GA civil aircraft. Okay, he cannot be better than sporting aircraft which have better speed and better maneuvering.
- Pilot replace config from Extra to some reactive small jet. I don`t think this can work because with more speed which is, by the way, limited at the start, this small reactive jet doesn`t have so good maneuvering.
Hacking of replacing aircraft config doesn`t work because type of aircrafts what is allowed to real RBAR is really the best type for this kind of air sport competitions. Anyway there is a moment when some person want to take a part in competition on Cessna 172. He knows that he will lose but he wants. So as it virtual maybe we have to accept it, I don`t know, I don`t have a decision about it.

Realization

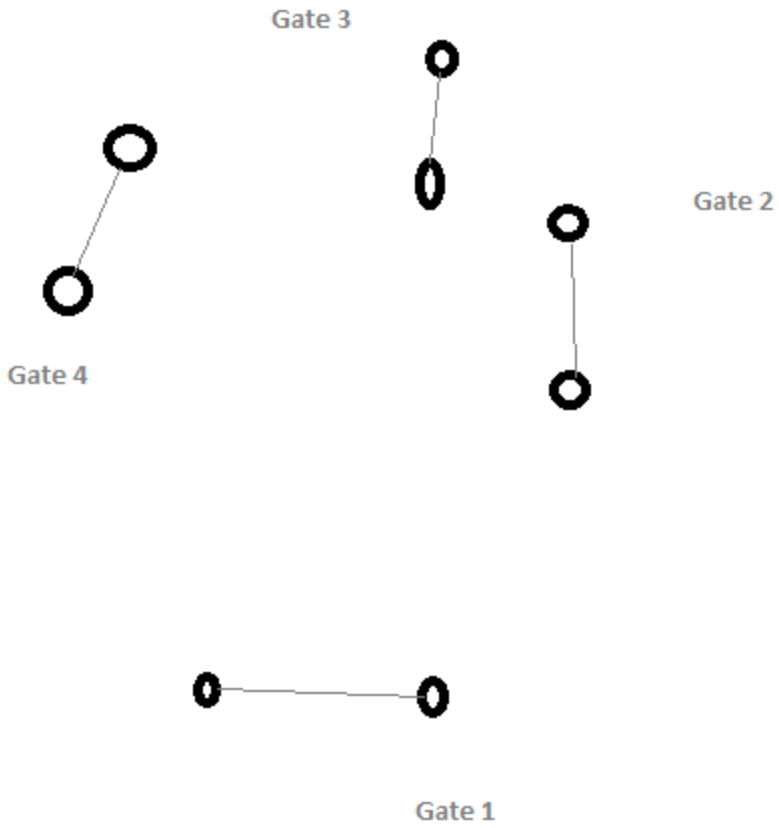
- Programming

There are a server and a client needed. There are a couple of moments but I will try to explain only the base in a few rods only - how client read flying. Because Im a little tired of writing, sorry. Of course I will explain my vision and how it works in details if we decide to make the project up.

Read a flying.
The key is FSUIPC. It is a software which can help to get the basic information about aircraft: type of aircraft, geographical position, position of aircraft in the air, speed, etc. So client can be programmed the way to use FSUIPC and get the information we need. What exactly we need:
- type of aircraft;
- geographical position;
- position in the air (angles of bank);

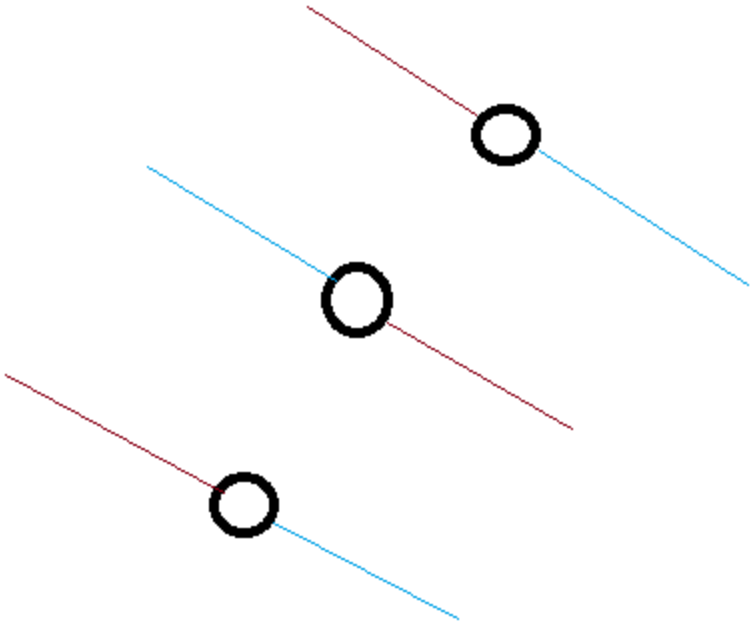
- speed;
- dimension of aircraft.

How the client read:
1. Client or server (if client doesn`t do penalties, if the client just send info to server) has coordinates of Air Gates. The coordinates are added manually by administrator.
2. The client has programmed "register line" from one pylon to another for each Air Gate. The line is between coordinates of each pylon.



3. The client read geographical position of aircraft. And when aircraft passes the line the client understand that pilot passes the Air Gate.
4. At the same time the client has parameters for each "register line" - position in the air and speed if needed. And when the pilot passes the line the client register aircraft`s position (angles of bank).
4.1. If it is a register line of start Gate, and pilot`s ground speed is between 371 and 380 kilometers per hour then the client gives penalty. If more than 380 - DSQ.

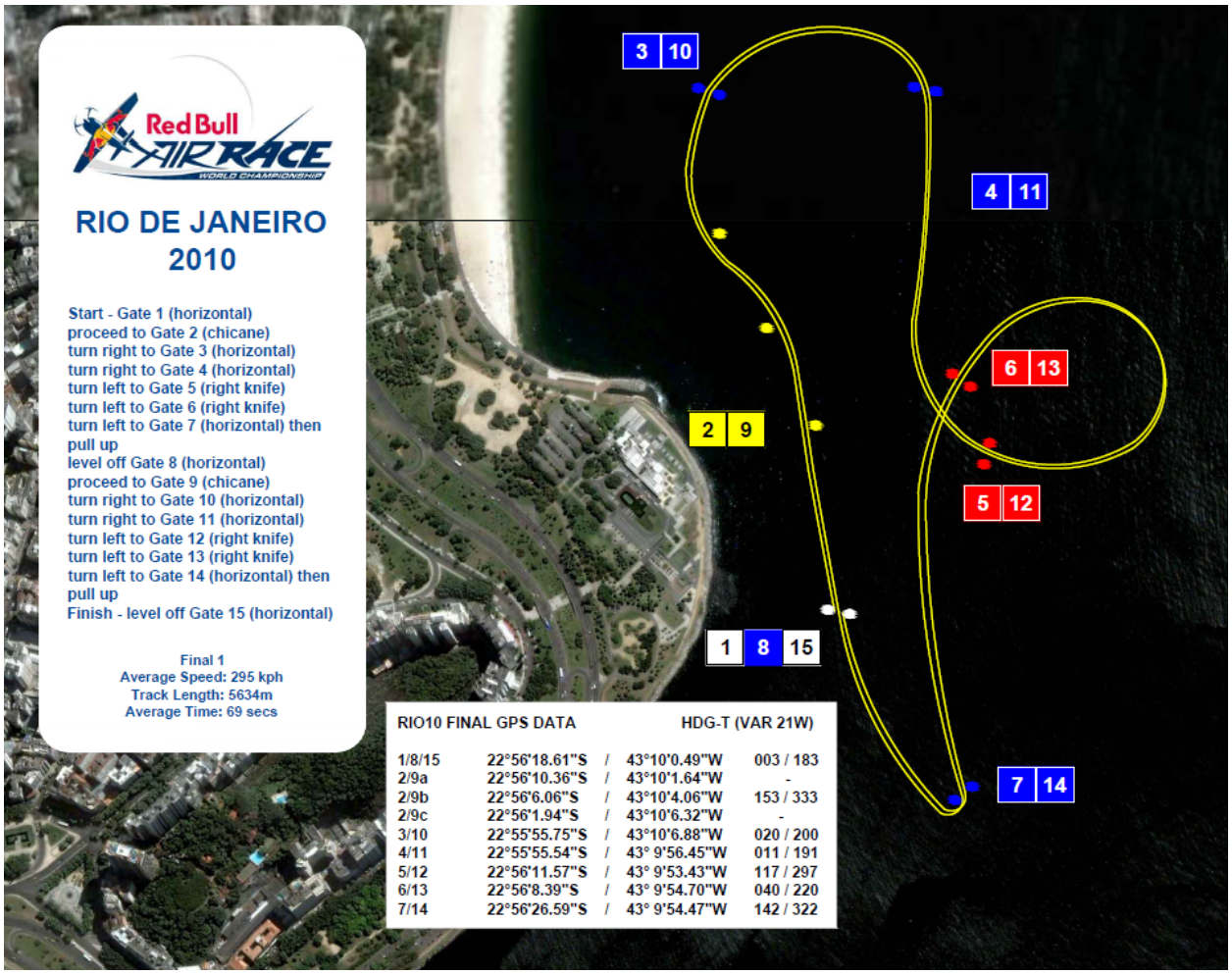
4.2. If it is a register line of any of Gates with Level Flight, and pilot`s angle is more than 15 degrees then the client gives penalty.
4.3. If it is a register line of any of Gates with Knife Level Flight, the same to the 4.2 but with another position in the air.
4.4. Also register line register plane`s altitude. So if pilot goes too high - it`s a penalty, if too low - DSQ.
4.5. The biggest problem is how to teach the client to understand touching a gate. To be honest I don`t know to do that and that is the only problem - how to read touching a gate. But I believe for this we need aircraft dimension. Im not sure can FSUIPC read information about dimensions from config file. And if yes, I still can`t see how to program this.
5. After operations with Gate number one, the client allows pilot to cross Gate number two. To be clear, client is always ready to read information about all Gates, all register lines so if the pilot will pass Gate number 3 after Gate number 1 the client will understand this and DSQ the pilot for breaking the race track order.
6. There are two register lines in the Quadro. And both register lines is one Gate. So if the pilot passes well the first line but brake the Knife angle at the second line the client will give a penalty.
7. The Chicane. There are lines from each pylon and these lines must be parallel. For more, the sides on each register line from the pylon is separated. Look at the picture below:



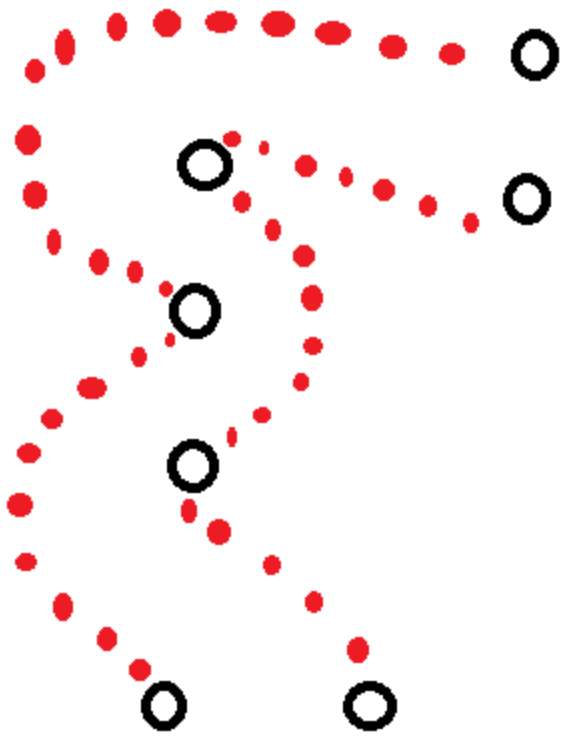
You see the different colours lines - blue and brown. For example blue line is correct way. So if the pilot passes the brown line what means he goes the wrong Chicane. And it is DSQ for pilot.
8. Of course - timing. When the pilot passes the first Gate line - start, when he passed the last Gate line - time is stopped.

- Scenery modeling

There is nothing difficult. I have materials about tracks. But only one track map has coordinates of Air Gates - Rio De Janeiro. I suggest to start scenery modeling from this race track.



What about major moments, very often I was asked about navigation. Well, it is a visual navigation if we dont pay attention that pilot has to know the track. There are a little balls in the river for example which navigate pilot. For example:



Of course I will explain and give all materials I have if we decide to make it up.

Discussion: http://www.cixvfrclub.org.uk/forums/index.php?topic=10082.0