Retrieving a Free Flight Model at 1200m

Fernando Zito, fzito@hotmail.com

Between April 30th and May 3rd the 68° Free Flight National Championship was held in Angaco, San Juan, Argentina. It was also the F1A, F1B and F1C team trials for the 2015 World Championship in Mongolia. During the F1C competition I had to do a Fly Off for the first place with my father Mauricio. The flight was scheduled at 5:00pm and 7 minutes duration.

At that moment there was still some thermal activity and the wind rotated to the east, in direction to the Pie de Palo Mountains, it is a big stone of 70 x 30 km. The two models were launched at almost the same moment, but they flew in different directions.

Mauricio's model flew to the northeast and it was seen until it landed. The timer was set to 5 minutes flight in order not to put in risk the model. But my model flew southeast and glided below the mountains peaks, so it was difficult to see it even with binoculars.

Two of Fernando's F1C models. The beacon mentioned in the test is shown in the inset. Powered by an 70mAh LiPo battery, it will transmit a signal for 15 days. The model in the background is the one which was temporarily lost.

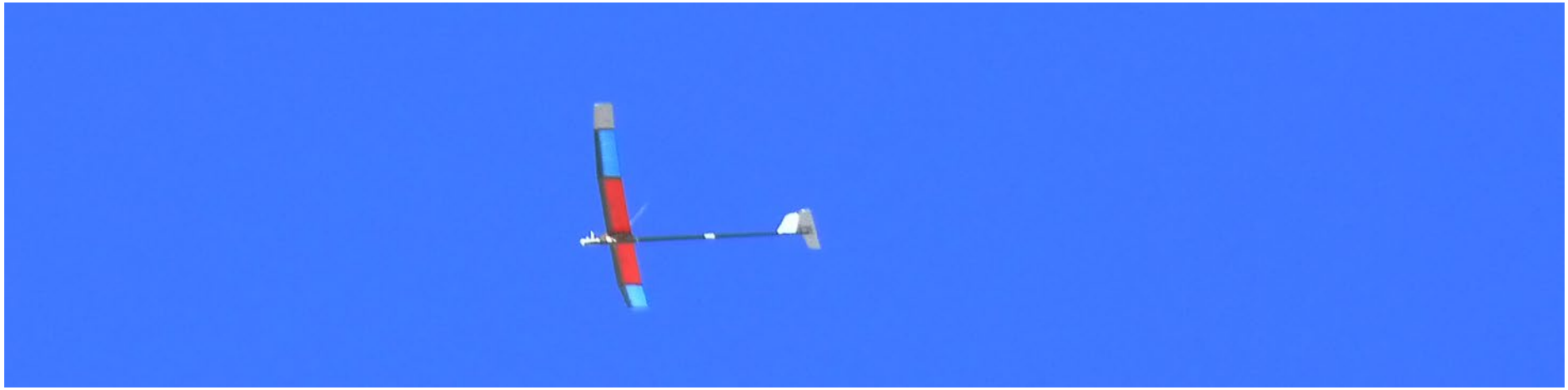
Readying the model for flying. Note the stabilizer tilt, the position it takes when dethermalizing.

The timekeepers lost it at four minutes and a half.

The model has a radio beacon that transmits a signal on VHF frequencies and it helps the competitor to find the model with a hand-held radio direction finder ("handy").

I went walking to the most probable area of landing, but the radio signal was weak and it was difficult to know where it came from. I thought that the model was still flying, helped by the thermals and wind dynamics against the Pie de Palo.

Typical launch of an F1C machine.



Power off and gliding for duration.

Finally I lost the signal after 80 minutes; it was when the model descended behind the mountains.

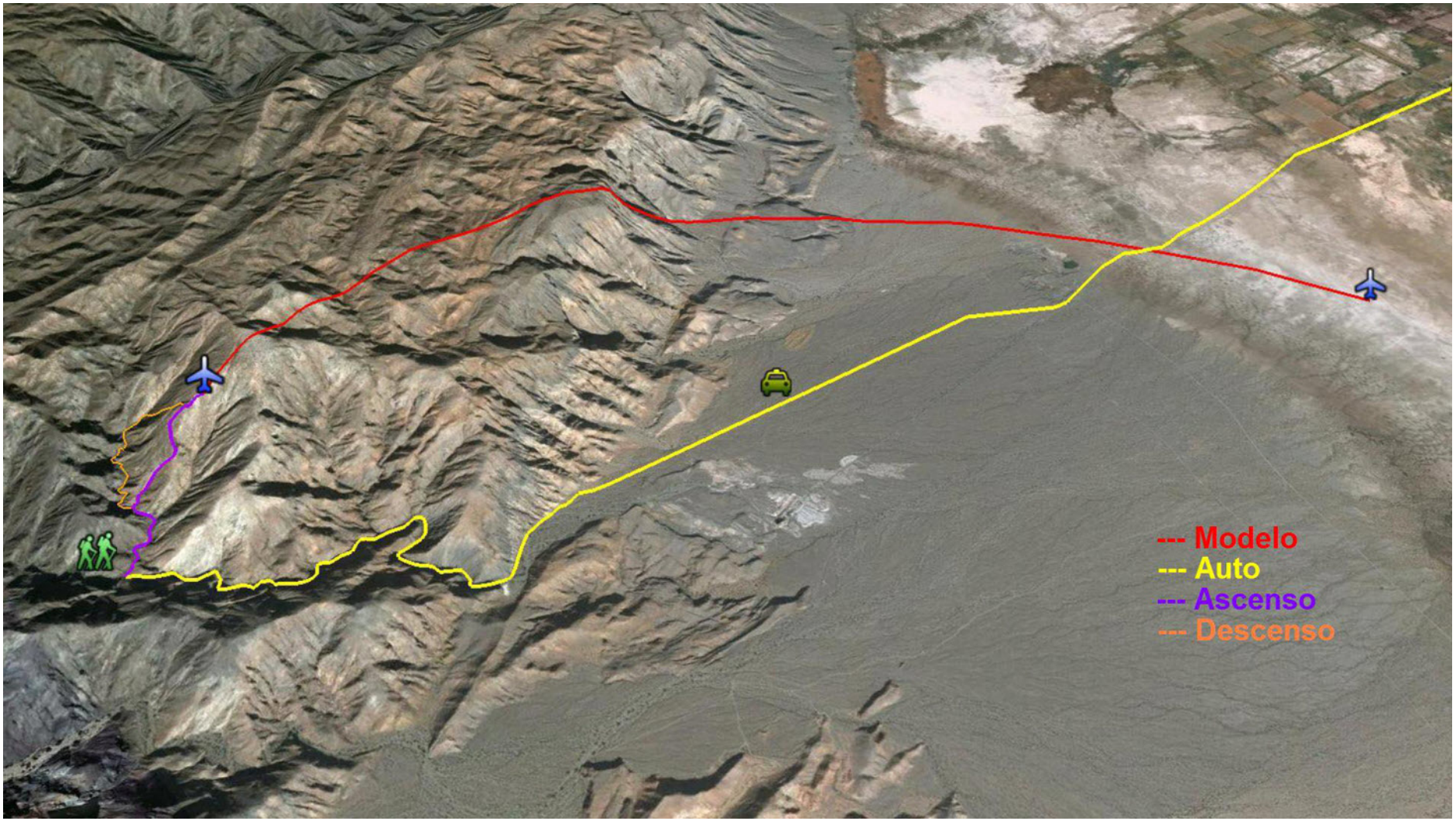
My friend Juan went close to the mountains with an ATV and saw the model flying with big birds at the mountain peaks, so my thoughts were right.

I used high sensitivity radios and different kinds of antennas but I couldn't hear the beacon signal again.

Four days later, at the end of the competition, I went to the Aero Club Pocito and rented the service of a Cessna 172 to fly over the mountains. After one hour of flying I heard the beacon signal, but it was to the North of the last known position of the model. I recorded the ground coordinates in a GPS and was able to determine a searching zone of many square kilometers. Luckily that area was crossed by a precarious road that leads to a mine in the heart of the mountains.

That afternoon, together with Mauricio and the Blanchero family, we took the road to the mine in two cars, but after some kilometers driving the road was closed with a barrier.

Searching for the model with a Cessna 172.



The path of the errant model over the ground is shown in red with the flight starting at the right and ending in the hills on the left. After flying over the mountains in the Cessna 172, the general location of the model was known, so Fernando and a search party drove into the mountains (yellow trace) and then walked up the ravine but did not find the model as its actual location was unclear.

Fortunately I began to hear the beacon signal and we continued walking.

The signal was stronger when we crossed to the ravine parallel to the road. But the signal bouncing against the mountains didn't let me know the origin of it with a short antenna. We walked many kilometers in the ravine and climbed some mountains trying to find the model. It was time to come back when the sun was falling.

The following day I went to the same place with Mauricio. With the help of a Yagi antenna and an attenuator I could know exactly the direction to the beacon signal origin, but we couldn't walk in a straight line. We walked in the ravine until a fork and then climbed by another way full of stones and thorns. To climb 70% of the mountain took us three hours; again it was time to come back when the sun was falling.

The beacon has a 70mAh LiPo battery that can last for 15 days in ambient temperatures. So I decided to come back to Buenos Aires in order to plan a new retrieval with the help of more people and with better equipment.

The following weekend it was raining in San Juan and it was dangerous to walk in the mountains. Finally we continued the search of the model two weeks after the Fly Off.

That time my great collaborator was José Debanne, he developed many multicopters of three, four and six propellers. These machines have auto stabilization and are capable of recording video in high definition, also they transmit video and flight parameters to the base and can make autonomous flights.

Our plan was to climb as high as possible in the mountain and set up a camp there. Then from the base fly the hexacopter in the direction to the radio signal that probably was behind the mountain. It could be possible to search for the model in places that were impossible for us to reach.

We had a few hours to climb, make the flight and come back. The equipment was bulky - some food, water, binoculars, GPS, compass, handies, Yagi antenna, quadcopter, hexacopter, RC transmitter, LCD screen, notebook, 2 kg of batteries, tools, etc. Also, our objective was

Picture from the camp site.

Hexacopter.

Picture from the Hexacopter.

Fernando's F1C resting peacefully at its landing spot.

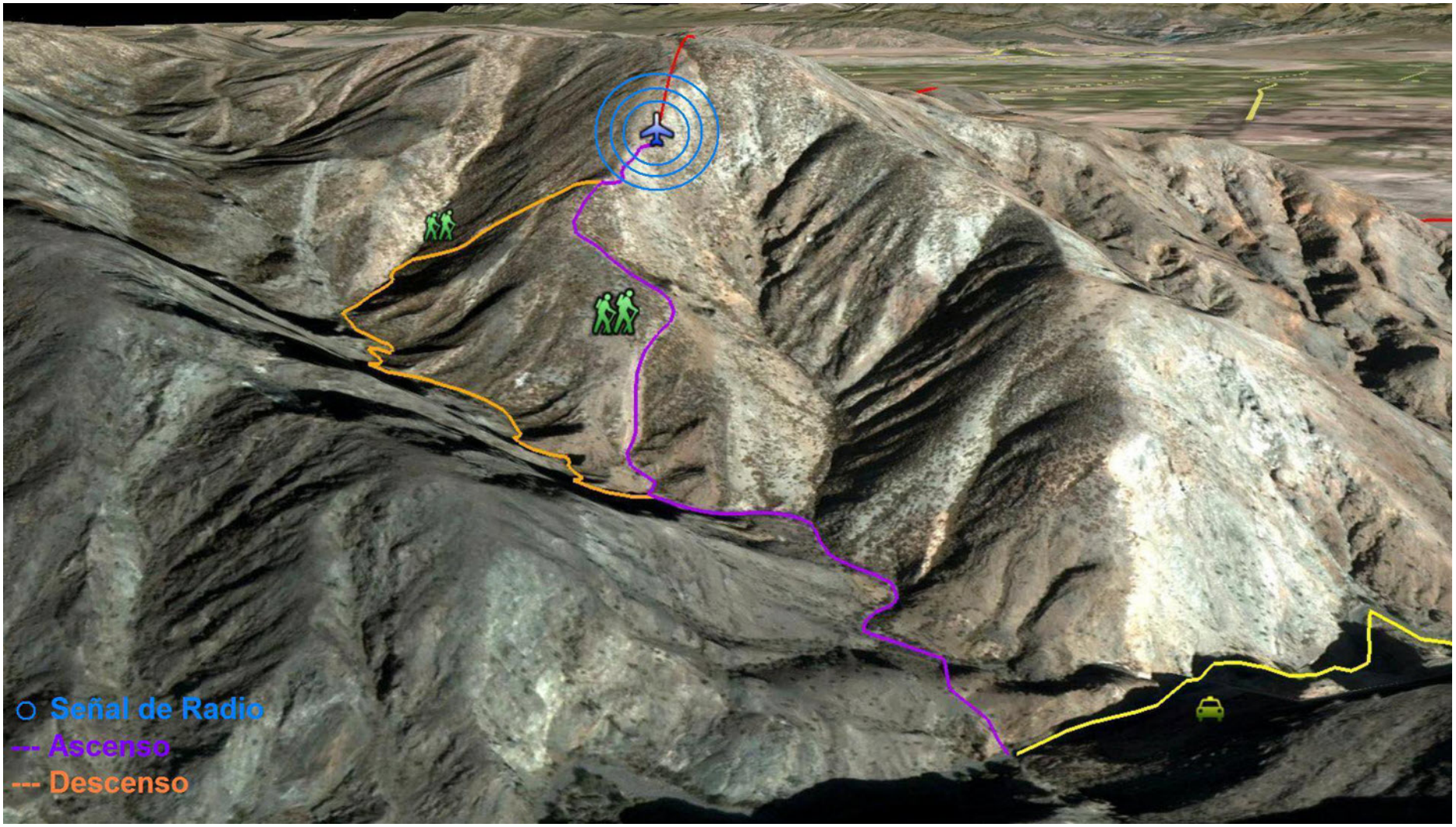
to retrieve the model of 2.7 meters wingspan without any damage.

José and I climbed by a longer trail but with fewer slopes because we didn't want to damage the equipment. That time we searched the model without the help of the beacon because the low temperatures at night dropped the battery voltage. Every 30 minutes we stopped to rest and plan the following part of the trail.

Suddenly we didn't have any safe trail to continue climbing to the peak of the mountain. We had to come back, but José looked around the precipice and noticed a red object 200 meters towards the top of the mountain; it was the wing central panel of my model!

The location was 1200m above sea level, or 600m above the

Model protected for the trip down the mountain.



The final assault. The ascent to the model is shown by purple trace, the descent is shown in orange.

starting line, the flight distance was only 6km in straight line. We had found the model but still didn't retrieve it. While I tried to find a safe way to the model, José was ready to take off the hexacopter and record the last part of our adventure.

The model had dethermalized and landed on a small plant, surrounded by hundreds of stones. I found the model there without any damage and 20 meters close to a wall of stones.

The descent was much harder than the climb because we didn't have a good perspective to find a good trail and because

Success!

Video QR code.

we had the model, part in a backpack and part in our hands. Luckily everything was fine. Flor and David Blanchero made a strong cardboard box to protect the model as it still had to travel 1200km back home.

You can enjoy a 14 minute film of the competition and model retrieval in the following link: <http://youtu.be/u08ECavkhPE>. Or use the QR code above.