

# High Altitude Test Flight – Magni Gyro M16 16 June 2006

( With constant speed prop )

**Pilot:** Arthur Gemperle

**Ground Crew:** Billie Jennings

We , Arthur and Billie planned the test flight well in advance by purchasing the right oxygen equipment for an expected flight at flight level of 195 (19500ft).

The most ideal weather for such a flight would be a cold dry winter day, which could be found inland in the Piet Retief area which is also far from any air traffic.

Because the engine performs better at density altitude which is a standard 15 deg C at sea level with a drop of 2 deg C per thousand feet gain in altitude, the ideal temperature at 19500ft would be -24 deg C. Piet Retief is at an altitude of 4000ft so the ideal air temperature at takeoff should be 7 deg C. The decision was to takeoff at around 10H00 because cool early morning air tends to descend at altitude.

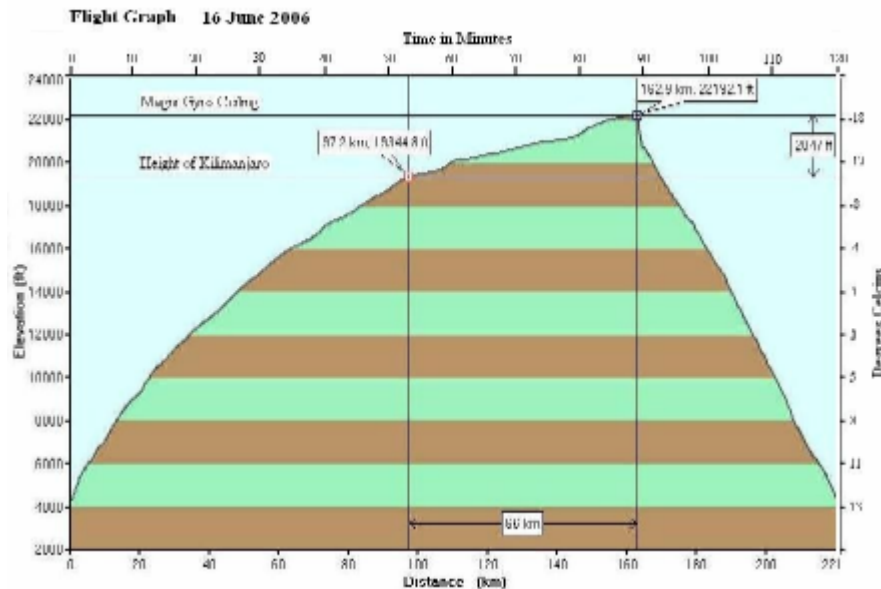


We polished the rotor and propeller for better performance and to avoid any possibility of icing on the low pressure side of rotor and propeller. Carburetor icing was also excluded by insuring the manifold pressure is kept well above the ambient pressure at all constantly. During the climb on a turbocharged engine the pressurized manifold air will be warm at all times; the problem would arise by descending with the engine at idle at such low air temperatures. We solved this problem by descending at a higher manifold pressure then the ambient pressure. That means that there is

only pressurized warm air at the inlet of the carburetor and not a low pressure which could cause icing. Arthur made sure that he was also appropriately dressed for such expected low temperatures.

With the above preparation and a day with the right conditions a successful flight could be expected.

Arthur's takeoff was on the 16<sup>th</sup> June at 10H22 as scheduled with ideal weather conditions, but slightly warm , 14 deg C . The total takeoff weight of the Gyro was 441kg (Gyro, Equipment, Pilot and Fuel).



He first established a 2-3m/sec (400-600ft/min) climb rate with a constant air speed of 60 miles p/h with a power setting of 85%, to avoid

initial stress on the engine up to 12000ft. At this altitude Arthur switched on the oxygen to 1.0 l/min. As the Magni's climb rate started to drop the power setting was increased to 90% which maintained a climb rate of 1m/sec (200ft/min) to an altitude of 19500ft at -12 deg C .The oxygen flow was increased to 2.0 l/min. The time of the flight thus far was 1hour. During this flight radio calls were made to ensure a clear air space. At that altitude the throttle setting was at 100% with 85% of the engine's power left and a climb rate of 1m/sec (200ft/min)

Arthur decided to prove the Magni's absolute ceiling. At this short notice he made a radio call on the Johannesburg information channel to inform air traffic about his intention to exceed flight level 195 for such a test, so as to avoid any conflicting traffic.

Arthur managed to reach within another half an hour at 75% power and a climb rate of 50ft per minute left , a maximum height of 22 192ft ( 6 763m) true altitude and an outside temperature of -18 deg C. That is a Density Altitude of 22812ft at a QNH of 1030 at ground level.

That means I was 2 851 ft ( 817 m ) higher than the highest free standing mountain in the world ( the Kilimanjaro 19 341 ft / 5895m )



With 20 liters of fuel left in the tank 40 liters was used to climb to that altitude. The correct descent took place and he landed happy and safe with his MAGNificent flying machine on the Piet Retief Airfield.

The total flight time was 2 hours with 48 liters fuel used..

We are confident in saying that the Magni Gyro's absolute ceiling has increased from 19 000 ft to 22000ft.

Arthur is grateful to Billie for recording all flight & performance data on ground and his help to make his



flight possible. .

Performance: Magni Gyro M16 Rotax 914 Turbo with constant speed prop  
 Gyro Empty: 300kg, Equipment 5kg, Pilot dressed 85kg, Fuel 60 liter = 51kg Total Takeoff weight = 441kg

Ground Level = 4200 ft ; QNH = 1030 ; Air Temperature = 14 Deg C

|   |        |        |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| True Altitude                           | 6000   | 8000   | 10000  | 12000   | 14000   | 15000   | 16000   | 17000   | 18000   | 19000   | 19500   | 20000   | 20500   | 21000   | 21500   | 22000   | 22200   |
| Air Temp. Deg C                         | 11     | 8      | 5      | 3       | 1       | -2      | -4      | -6      | -8      | -10     | -11     | -12     | -14     | -15     | -17     | -18     | -18     |
| Motor RPM                               | 5200   | 5400   | 5400   | 5400    | 5400    | 5400    | 5400    | 5400    | 5400    | 5400    | 5400    | 5400    | 5400    | 5400    | 5400    | 5300    | 5300    |
| Rotor RPM                               | 380    | 385    | 390    | 400     | 410     | 415     | 420     | 425     | 430     | 432     | 435     | 436     | 437     | 438     | 439     | 440     | 440     |
| Ambiance Pressure                       | 25     | 23     | 22     | 21      | 20      | 19      | 18      | 17      | 16      | 15      | 14.5    | 14      | 13.5    | 13      | 12.5    | 12      | 12      |
| ManiFold Pressure                       | 32     | 32     | 32     | 32      | 32      | 32      | 33      | 33      | 33      | 32.5    | 32.5    | 32      | 31.5    | 31      | 30.5    | 30      | 30      |
| Throttle Set %                          | 85     | 85     | 85     | 85      | 85      | 85      | 90      | 90      | 90      | 90      | 90      | 100     | 100     | 100     | 100     | 100     | 100     |
| Availible Power %                       | 85     | 85     | 85     | 85      | 85      | 85      | 90      | 89      | 88      | 87      | 86      | 85      | 82      | 79      | 77      | 75      | 75      |
| Prop Pitch Degree<br>Sea Level 11.5 Deg | 14.5   | 15.5   | 16.5   | 17.4    | 18.2    | 18.6    | 19.2    | 20      | 21      | 21.5    | 22      | 21.5    | 21      | 20.6    | 20.3    | 20      | 20      |
| Climbrate ft/min                        | 600    | 600    | 600    | 500     | 500     | 400     | 400     | 300     | 300     | 200     | 200     | 200     | 100     | 100     | 100     | 50      | 50      |
| Air Speed m/hr                          | 60     | 60     | 60     | 60      | 60      | 60      | 60      | 60      | 60      | 60      | 60      | 60      | 60      | 60      | 60      | 60      | 60      |
| Oil, Water Temp.                        | 100/95 | 100/95 | 100/95 | 105/100 | 105/100 | 105/100 | 110/100 | 110/100 | 110/100 | 110/100 | 110/100 | 115/105 | 115/105 | 115/105 | 115/105 | 110/100 | 110/100 |

## Pilots Profile : Arthur Karl Gemperle ~ 2010

I am 60 years old & have been a retired mechanical engineer for the past 15 years. I thought that water sports ( water-skiing, scuba diving & wind surfing ) would be the ultimate sport for me, until I discovered that to be in the air is even more exciting.

I always enjoyed being where mankind is not supposed to be. Now I spend my life enjoying aviation to the fullest.

I have been paragliding for the 10 years. The total for the first 3 years was about 1000 flights.

Thereafter I had a complete hip replacement due to wear & tear from a car accident 25 years ago. Eight months later I began paragliding again. I then decided to look for something where I could land on wheels & not on my feet anymore.

After some research I decided to buy a Magni gyrocopter, which I believe is the ultimate flying machine.

I enjoyed paragliding as a quite way of flying. 10 years later I have 1500 flights & 1150 hours in the air.

Now I have been flying the gyrocopter for 10 years, and I have 1200 hours on this aircraft.

My longest flight in one day, with 3 fuel stops was from Cato Ridge to Plettenberg Bay, 1020 Km, 8 hours air time.

The most enjoyable trip was from Cato Ridge to the top of Namibia and return, during my 14 days holiday.

We covered a total distance of 6500 km, which is equivalent from Johannesburg to Cairo one way.

My latest record flight was climbing to an altitude of 22 000 ft at -18 degs .

This is a Magni Gyro and an African record.

My latest trip was to Mozambique & the Portuguese islands. On my return flight on the 1<sup>st</sup> May 2010, King Shaka Airport opened its doors for the first time. I landed with my Magni Gyro on an international flight as the very first aircraft at King Shaka Airport.

I always enjoy having a passenger to share the MAGNIficent flying machine & the experience.

In the meantime I have built my own Rotorway helicopter over 1 500 hrs building time to be able to take off vertically.

I have passed my licence with 60hrs of training just before my 60<sup>th</sup> birthday .On the helicopter I already have flown 150 hrs & made a new altitude record for a piston engine driven helicopter, over 16 000 ft with my own designed intercooled supercharger on the Helicopter.

So far I have a total of 2 500 hrs in the air.

I still enjoy flying. Hopefully for many more years to come, as the best form of total freedom.