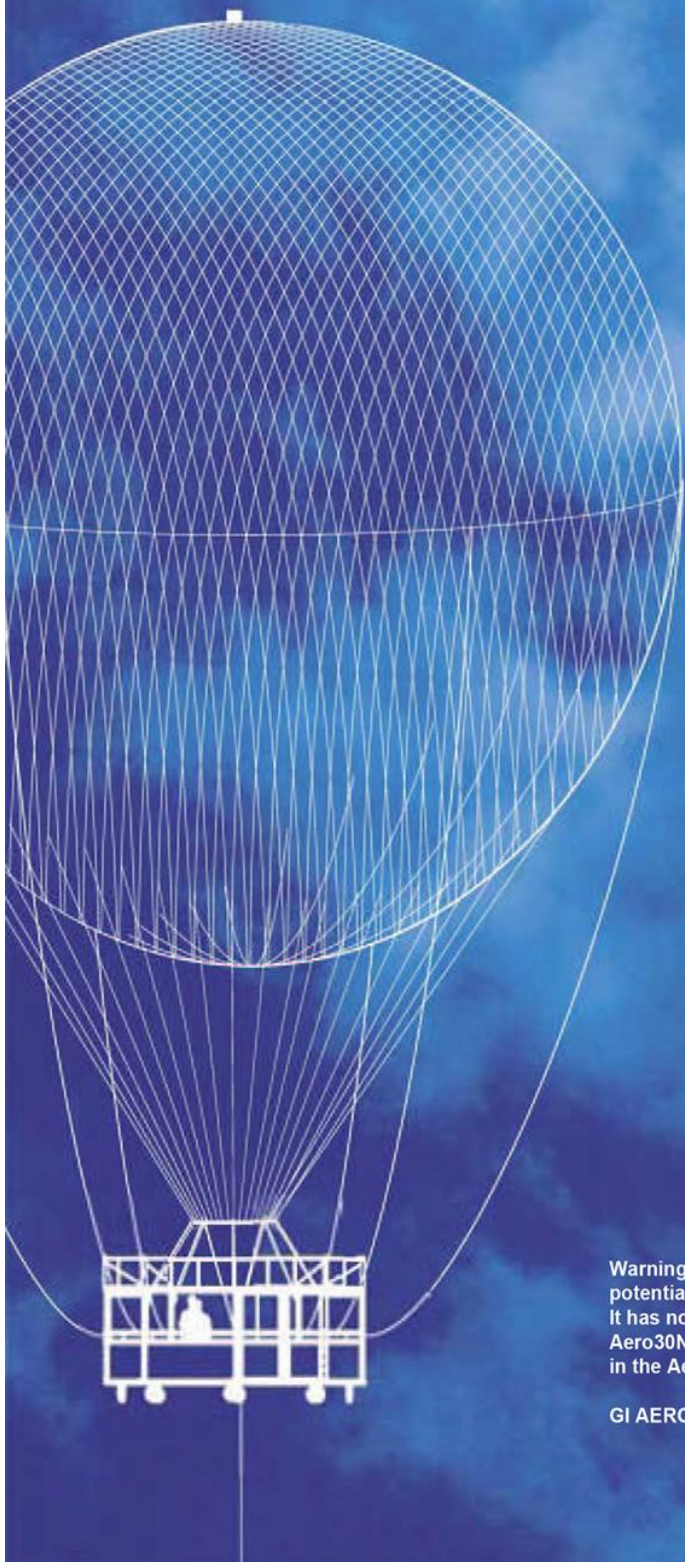


Aero30 —NG—

GENERAL INFORMATION



Warning : the purpose of this document is to provide true and honest information for potential users of an Aero30NG system.
It has no regulatory or contractual value. The regulatory information appears in the Aero30NG flight and maintenance manuals. The contractual obligations are contained in the Aero30NG contract of sale.

GI AERO30NG - ©AEROPHILE SAS

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I. PRESENTATION

Not only manufacturer, AEROPHILE SAS also operates its own balloon since 1994 and flies every year 500 000 passengers in its own balloons which gives us a great experience in design and building a profitable system. Therefore, with 18 years of experience, the Aero30NG is the latest and most radical development of the tethered gas balloon built by AEROPHILE. The Aero30NG successfully combines all our renowned qualities of safety, reliability and durability with increased performance all around and a much improved ease of daily use.

SAFETY

Safety is a continuing obsession. In order to guarantee complete safety, the Aero30NG was certified in the same way as an aircraft according to international aeronautical rules and inspections. AEROPHILE holds a design approval organization (ADOAP) and a part 21F manufacturing approval from European Aviation Safety Agency (EASA).

The Aero30NG incorporates a number of unique characteristics which are fundamental for safety:

- in the event of a cable break, the Aero30NG will not burst, and will return to earth with a terminal velocity that should not prove life threatening;
- the winch house has three fully independent systems for bringing the balloon back down;
- the conical platform offers complete passenger safety during the take-off and landing phases;
- LCD screen instrumentation 'glass cockpit' on board to summarize all flight information;
- A fast deflation panel to protect the equipment from extreme weather.

DURABILITY

Our envelopes are designed for extreme durability. The record is held by the envelope of Mylau in Germany. Inflated in March 2000, it was deflated in October 2007, which means 91 months without deflation.

PERFORMANCE

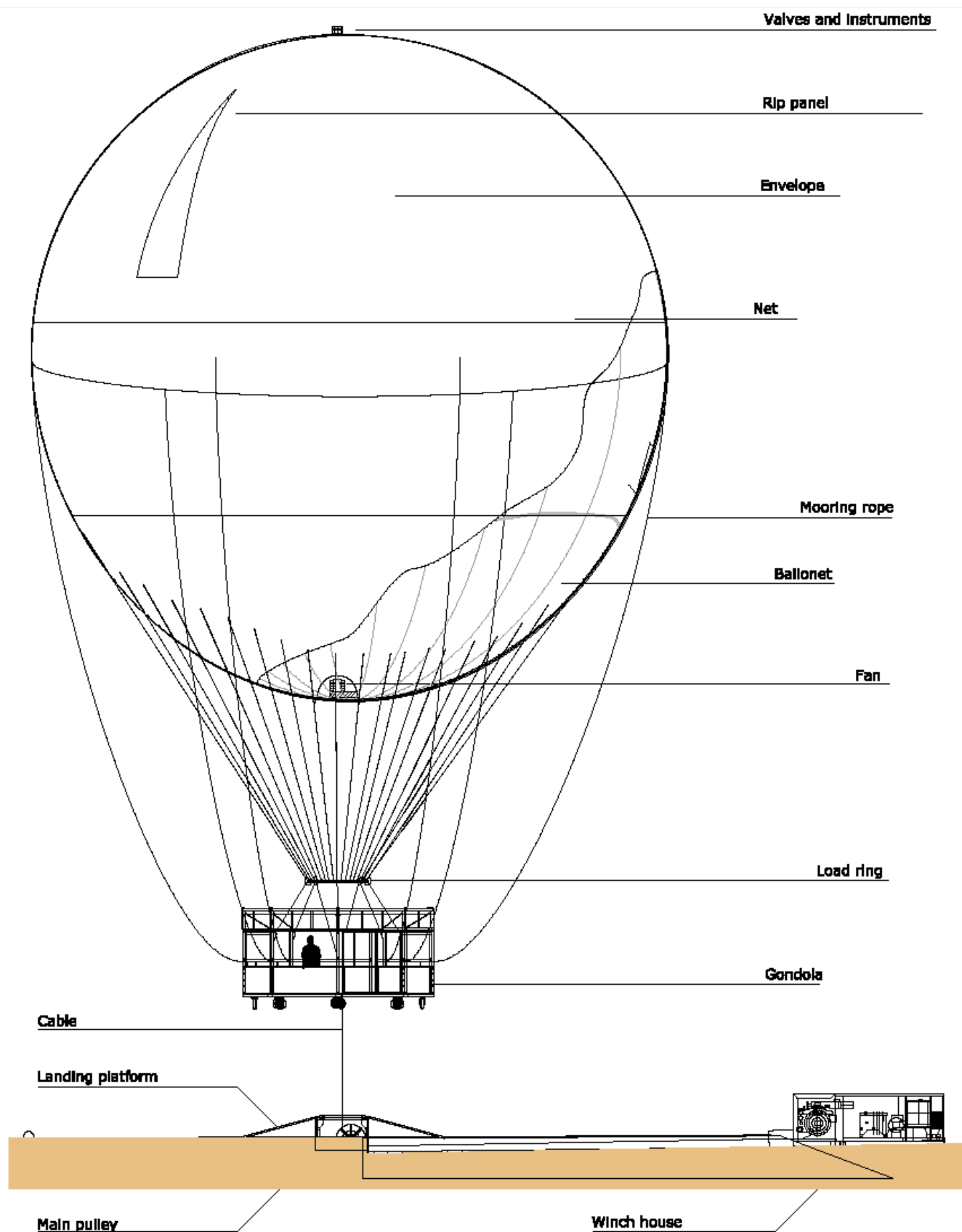
The Aero30NG is a well-proven system: To date 69 Aero30NG systems have been installed on 5 continents and have carried millions of passengers.

The performance of the Aero30NG allows optimum operation:

- new ultra-light 6 200 cum envelop with a minimum lift warranted ground level 4.8 T
- high line speed of winch allowing 6 flights per hour to 150 metres,
- large floor area of lightweight gondola comfortably allows 30 passengers,
- simplified tethering/mooring operations,
- minimum helium losses.

Our long experience allows us to develop a very innovative system named "Remote display and flight performance monitoring". By recording and analysing permanently the flight and weather datas, this system can properly evaluate the performance of the operating team ((+15% in revenue recorded in one of our operation).

I. 1. Description



I. 2. Technical specifications

- Dimensions

- * Volume : 6200 cubic metres (219000 cubic feet)
- * Balloon diameter: 22.80 metres (75 feet).
- * Total height: 34 metres (105 feet).
- * Gondola diameter: 5.80 metres (19 feet).
- * Landing platform diameter: 9.6 metres (31 feet).
- * Winch house: 4 m x 2.2 m x 1.5 m high (13 feet x 7 feet x 5 feet height).
- * Retrieval cable:
 - diameter 22 mm (0,9 inch),
 - useful length: 150 or 300 m (490 or 980 feet).

- Weight

- * Envelope: 900 kg (1980lbs).
- * Net: 290 kg (638lbs).
- * Gondola, load ring and equipment: 1,050 kg (2,310lbs).
- * Winch house: 6 tonnes (13,200lbs).
- * Central pulley (including chassis): 2 tonnes (4,400lbs).
- * Retrieval cable: 2.4 kg/m (1,6 lbs/ft).

- Performance

- * Net lift of the balloon (gondola landed): 4.8 tons (10600 lbs).
- * Maximum number of passengers in addition to pilot: 30.
- * Ascension height: 150 or 300 m (490 or 980 feet).
- * Winch power: 45 kW.
- * Speed: ascent: 0.80 m/s (2,6 feet/s) ; descent: 0.65 m/s (2,1 feet/s).
- * Number of cycles per hour: flight at 150 m (490 feet): 6; flight at 300 m (980 feet): 3.
- * Retrieval cable strength: 45 tonnes (99,000lbs).
- * Envelope fabric strength: 4,000 kg/ml (2680 lbs/ft).
- * Gas porosity: 50 m³/month (1760 cubic feet/month).

I. 3. The envelope

- The fabric

The quality of the fabric is absolutely essential to flight safety and balloon longevity. The fabric used by AEROPHILE is the result of more than 30 years experience with gas filled balloons. It comprises a textile base specially coated on both sides:

- inside coating: translucent polyurethane membrane, ensuring low helium porosity,
- outside coating: polyurethane membrane, optimized to protect the fabric from negative environmental influences as acid rain, ice and UV-radiation,
- textile base: special treated polyester fabric.

- Assembly

The fabric is assembled partly by hand and by computerized welding machine. The joints are reinforced on both sides with tapes. The seam is more robust than the fabric itself.



Assembly of the fabric in the factory

- Ballonet

The bottom part of the envelope contains a ballonet with a large-volume. Its function is to counteract variations in helium volume under the effects of temperature and pressure changes.

- Rip panel

The envelope is equipped with a deflation “rip panel”. The panel is triangular and located in the top of the envelope. It is used only for emergency deflation of the balloon. The rip panel is a key element in passenger and equipment safety. If the tether cable breaks, this rip panel also enables the pilot to land the passengers safely once the balloon is back down to near ground level. This panel also helps protect the envelope by deflating it quickly (in less than 10 minutes) in the event of sudden severe winds or in the event of breakage of the attachments (net, mooring ropes, etc.) in extreme weather.



Internal view of the rip panel

- Fabric integrity (Porosity)

The porosity of the AEROPHILE fabric is better than 1 litre per m² per 24 hours. In practice, this means a recorded helium loss of 50 m³ per month. The fabric's integrity is essential to the profitability of the system. The balloon is permanently inflated so high porosity would lead to disastrous helium losses. As helium is extremely volatile, a gas-tight fabric is very difficult to achieve.

The fabric must:

- offer a high degree of integrity to resist helium loss,
- maintain continued low porosity whilst ageing.

- Life-span

The proven life span of the first Aero30 envelope is 11 seasons recorded in Berlin (Germany). Nonetheless envelope life depends on the conditions found at its location, and longevity will be affected by the levels of ultra violet radiation (sunlight) encountered at the operating site.

- Colour

The fabric can be coated with a colored PU which provides a very resistant mass color. Different colors can be used to patchwork the balloon in attractive manner for low cost – see § II.7.

Dark colours should be avoided, as they lead to large temperature rises and considerable gas expansion when exposed to sunlight. The fabric can be specially painted: see § II.7.

- Certification and quality control

The envelope is produced using an internationally recognised Implementation Rules (IR 21) approved aeronautical process. Samples are glued onto the envelope for the purpose of conducting annual tensile strength tests. The samples are easily removed without having to deflate the balloon. Throughout the balloon's life, the tensile tests are performed by AEROPHILE, free of charge.

I. 4. The net

- Material

The net is made of polypropylene, impregnated with a super resistant UV protection. This material is light and does not get heavier when wet.

- Manufacture

The net is hand-made by craftsmen. The attachments are made entirely by splicing without any use of knots. (Using knots causes a considerable loss of tensile strength). The crowfeet are made with splices and eye-rings ensuring perfect load distribution in the various net shrouds.

- Design

The strength of the net is essential to passenger safety. The AEROPHILE net is designed throughout with a factor of safety of more than 10.

- Equatorial attachment

The net is equipped with 16 external mooring or guy ropes, attached by crows' feet around the equator of the balloon. This ensures that any forces on the balloon when moored are evenly distributed through the equator ring. The 16 external mooring ropes are paired thus allowing a quick mooring system with only 8 attachment points.

- Colour

The polypropylene rope is white, but marked with red and blue bands for locating the correct position of the net on the envelope, in particular when inflating.

- Life span

The proven life span of the net is 6 seasons. The net can be replaced without deflating the balloon.

- Certification and quality control

The net is produced under aeronautical certification (IR 21). Rope samples are taken from each reel to test their strength.

Samples are placed on the net so that the integrity can be checked over time by further tensile strength tests. The tensile strength tests are performed annually, free of charge by AEROPHILE throughout the life of the balloon.

I. 5. The gondola

- Materials

The gondola is made of moulded polyester compartments assembled on an aluminium structure. This composite structure combines strength with minimum weight.

- Performance

The gondola is a circular doughnut shape with an external diameter of 5.80 m (19 feet), offering a usable floor area of 14 m² (150 square feet). It is accessible to wheelchairs and weights only 850 kg (1,870lbs). Its large central opening (4 m -13 feet- in diameter) is essential in maximising the limits of the flight envelope, as using a smaller central space would suffer the penalty of the retrieval cable being more likely to touch the gondola in windy conditions, so requiring flights to be stopped.

- Wheels

The self-steering wheels enable the gondola to be re-centred around a central landing cone on the platform. This re-centring is essential for passenger comfort and safety: it effectively ensures that the gondola remains stationary on the ground, despite any wind induced oscillations of the balloon.

- Colour

In the standard version, the aluminium structure is grey and the polyester compartments are blue. It can be customised to any colour on request.

- Net

Protective nets are placed around the gondola gallery to prevent objects from falling out and to provide protection and security for passengers.

- Life span

There is no limited life span for the gondola.

- Certification and quality control

The gondola is designed in accordance with the requirements of FAR 31 TGB. Each gondola is individually tested in the workshop at assembly and then through load testing, with an overload of 50% more than the maximum load. This test leads to the issue of the Bureau Veritas report, which is forwarded to the aeronautical authorities issuing the certificate of airworthiness for the complete balloon system.



Gondola flying above Paris

I. 6. The equipment

- Helium Valve

The valve operation is mechanical with an automatic over ride. It opens outwards:

- * when the pilot opens it using the control rope, one end of which is fed through to the gondola,
- * automatically in the event of over-pressure.

It is automatically closed by two return springs when the pilot releases the control rope or when the over-pressure ceases in the envelope.

The valve is designed to protect the envelope from stress damage, or even bursting in the event of excessive over-pressure. Its integrity is excellent; in fact the seal is better than that of the fabric itself.

- Fan

A powerful variable speed fan is used that is capable of maintaining a very high level of pressurisation within the ballonnet/balloon. The fan is housed inside the envelope at the balloon's South Pole. It is protected by a moulded epoxy shell.

It is a high-power system (800-Watts) which means that:

- * sufficient over-pressure can be provided in the envelope, even for extreme winds: up to 800 Pascal overpressure;
- * It is capable of restoring pressure very quickly: for example in the case of sudden cooling owing to passage of cloud or a rain shower.

It is operated from a control box with a variable-frequency control dial, allowing automatic adjustment of the over-pressure in the envelope to suit meteorological conditions, in particular while moored when not in use.

- Control box

It is located in the gondola, on the pilot control panel, and is used primarily to control operation of the fan and its valve. When moored the desired internal pressure is set on the dial, and the fan then rotates at the rpm required to maintain pressure. In calm conditions the rpm is very low, but during storms the rpm is increased as necessary.

A simple control allows:

- venting of air from the ballonnet during the flight, in the event of over-pressure in the envelope as the balloon rises;
- ventilation of the balloon on the ground, in 2 ways:
 - * automatic: overpressure determined according to the wind conditions will be automatically maintained in the balloon, whatever the variations in temperature and atmospheric pressure;
 - * emergency: pressurises the balloon to aid resistance to high wind speeds.

- Radio-control

The pilot controls balloon ascents and descents by a portable radio-control device in the gondola. The radio-control is fail safe and its frequency is adapted to the location to meet the local regulation for radio-transmitting.

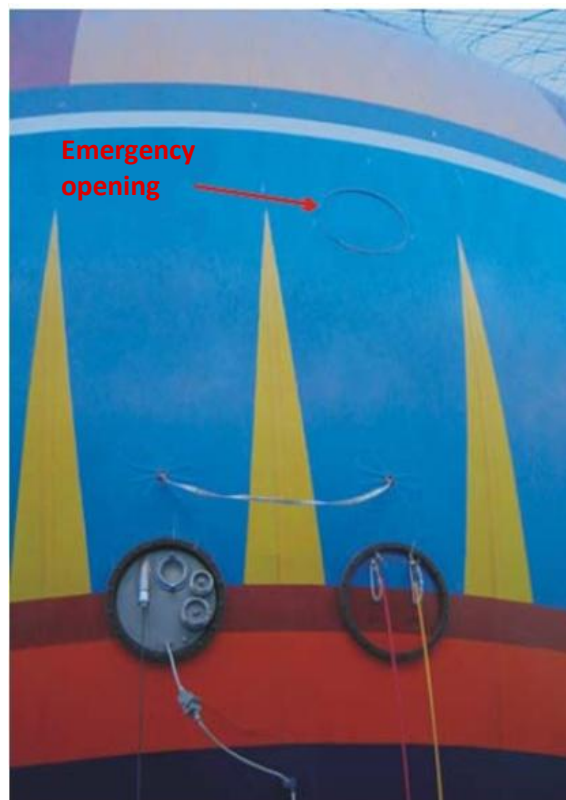
- Position lights

The top of the balloon is fitted with a steady red position light identifying it as a very high obstacle. The position light can be activated by the pilot from the gondola. An LED display on the control panel confirms that the light is working.

- Control ropes

The balloon is equipped with the following control ropes:

- * white rope: this enables the pilot to open the top valve and release helium. This is only required if there is too much helium, or to completely deflate the balloon.
- * yellow rope: this is used to open a panel located in the helium cell of the envelope. It is opened to prevent any over-pressure in the envelope, in particular in the event of inadvertent free flight, e.g. during an ascent to high altitude.
- * black rope: this is used to open a panel located in the envelope ballonnet and is designed to prevent over-pressure in this part of the envelope in the same circumstances as above.
- * red rope: this is used to open the “rip panel”. The panel is triangular, 7m long and located at the top of the balloon. Once opened, this is irreversible and allows emergency deflation of the envelope. It should only be used in an emergency such as preventing structural damage in high winds and for final landing if the retrieval cable has broken. It can only be re-sealed in the workshop. It has the same low level of porosity as the rest of the envelope and leads to no additional helium losses.



Special opening at balloon side

- On-board batteries

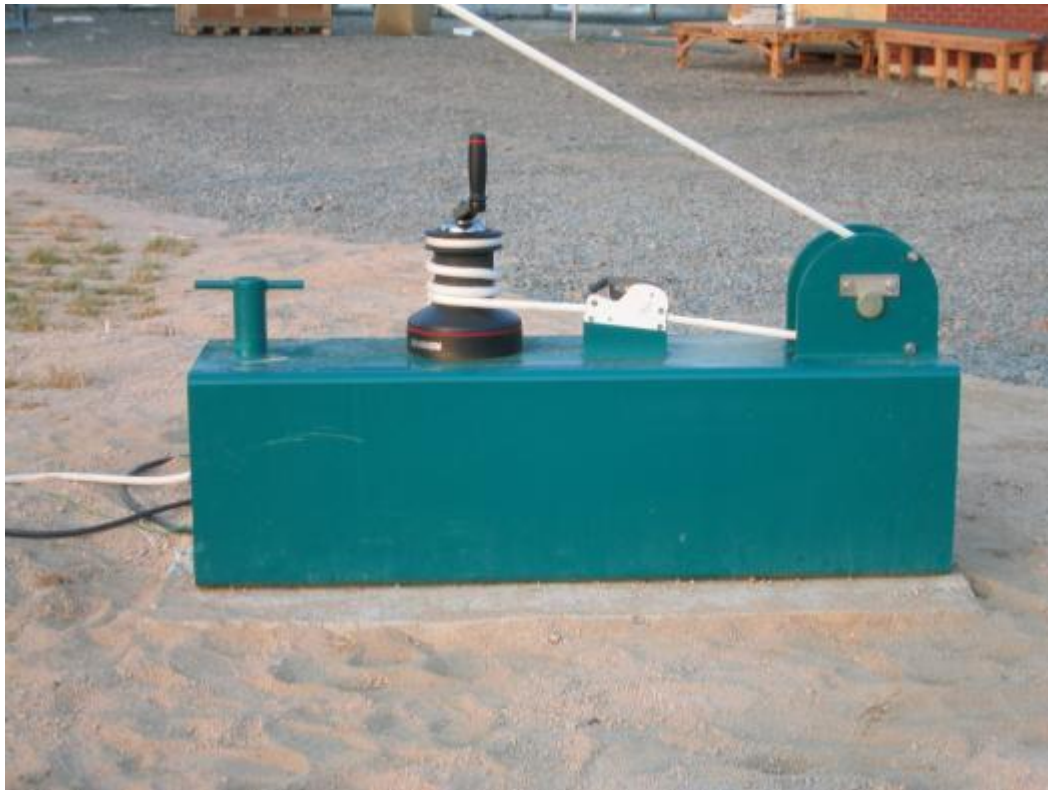
A 24V on-board battery pack is carried in the gondola to supply the flight instruments and controls. The batteries are automatically recharged in the gondola when the balloon is tethered and the ground power cable connected.

- Chargers

The batteries and equipment cells are supplied with all the appropriate chargers.

- Mooring tables

The Aero30NG is supplied with 8 custom designed mooring tables enabling significantly easier mooring operations. Adapting big yacht equipment (capstan winch, clutch locks and bollards ...) to the balloon, the mooring tables allow the balloon to be secured more quickly and safely in all conditions.



Mooring table

I. 7. The instruments

The balloon is equipped with a large array of instruments enabling the pilot to monitor and operate the balloon within the safety limits. All readings are available on the control box facing the pilot position in the gondola.

The instruments supplied are:

- an airspeed indicator, with the sensor at the top of the balloon, for reading the relative wind speeds and maximum gusts;
- an altimeter, informing the pilot of his/her height above the ground throughout the flight;
- a vertical speed indicator, enabling the pilot to check the speed of ascent and descent;
- a dynamometer (load cell), is located at the confluence point where the retrieval cable is attached to the balloon suspension wires, informing the pilot of the balloons lift;
- a pressure gauge, informing the pilot of the pressure inside the envelope;
- a thermometer, with the sensor at the top of the balloon, informing the pilot of the temperature inside the balloon, in particular allowing the heating effect of solar radiation to be monitored.
- an empty ballonet indicator

The instrument panel combines all the instrument's indications on a single LCD screen.

A flight computer calculates and saves all the instrument data and indicates clearly to the pilots the following dangers:

- the maximum pressure authorised in flight is exceeded;
- the balloon's lift values are exceeded;
- factor between wind and lift (balloon load) displayed by graph is exceeded;
- opening of the top valve;
- the gondola doors are unlocked;
- opening of the helium valve;
- either mains power or fan failure (when moored on the ground).

The control box is illuminated so that the instruments can be read in the dark, e.g. during night flights.



Instrument panel



LCD screen

I. 8. The retrieval cable

- Type of cable

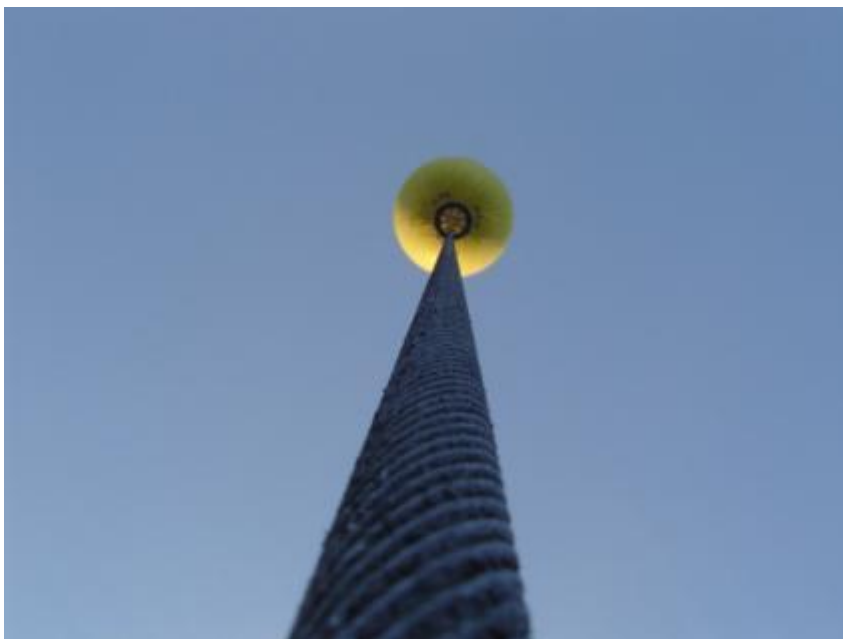
The high tensile cable is made of wound galvanised steel that is impregnated with plastic and grease. The end is fitted with a swivel shackle, which enables the balloon to rotate on its axis under the effect of the wind, with no consequences of winding/rotation for the cable. Its diameter is 22 mm with reinforced tolerance (special manufacturing process).

- Factor of safety

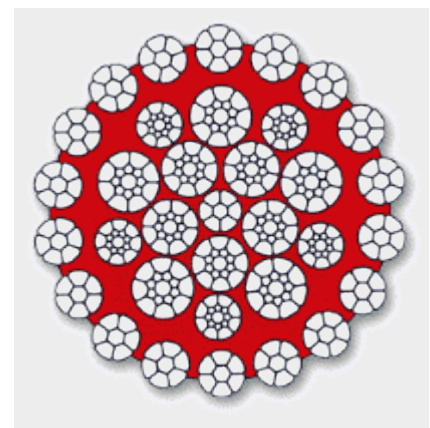
The minimum tensile strength of the retrieval cable is 45 tonnes. The maximum load applied to it however is 4.3 tonnes, when the gondola is on the ground. The factor of safety for this cable is therefore in all cases greater than 10, and when the balloon is in flight, it is greater than 14. Given the number of passengers normally carried and the effects of the wind, the factor of safety is usually greater than 20.

- Cable ends

The free or balloon end of the retrieval cable is terminated into a conical socket basket. The cable-socket assembly is stronger than the cable itself. The winch end is attached to a corner clamp bolted to the winch drum. This fixing is stronger than the cable itself.



View of the cable



Cable cut view

I. 9. The winch House

- Design

The winch equipment is specially designed to handle the Aero30NG balloon. All the strictest standards regarding operations and aerial work with the public were included in its design, under the control of the Bureau Veritas, which has been certifying this part of our equipment since 1993.

- Performance

The nominal winch load is 4.8 tons (10,560lbs).

Its speed is:

- 0.80 m/s (2,6 ft/s) in the ascent,
- 0.65 m/s (2,1 ft/s) in the descent.

The high line speed enables a 150 m (492 ft)-flight cycle to be made in less than 10 minutes, including boarding and disembarkation, or 6 flights per hour.

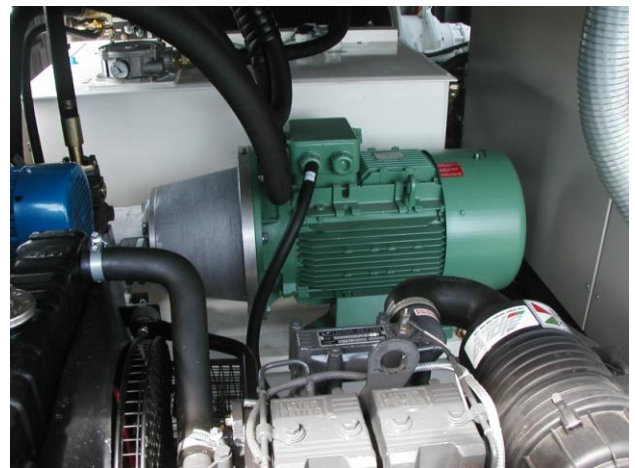
- Main, auxiliary and emergency system

For optimum safety, the winch system has 3 independent systems for retrieving the balloon.

1. Primary system

The primary system comprises:

- * a 45 kW electric motor,
- * a hydraulic pump,
- * a hydraulic reservoir and hoses,
- * a hydraulic motor,
- * a drum for storing the retrieval cable,
- * a positive safety band brake,
- * a positive safety disc brake.



The primary system can be operated by the pilot from the gondola, using an approved radio-control (reserved frequencies approved for lifting, specific to each country of operation), or from the control console on the ground.

To guarantee the highest possible level of passenger safety, a large number of parameters are continuously monitored while the primary system is operating. When an anomaly is detected, the primary system is set to safety mode, the winch stops and the anomaly is indicated on the control console. The ground crew can then take the necessary measures, for example bringing the balloon down using the auxiliary system.

2. Auxiliary system

The auxiliary system comprises:

- * a diesel engine started by an independent and automatically charged and regulated battery,
- * a pump independent of that of the primary system,
- * an hydraulic reservoir and hoses independent of those of the primary system,
- * an hydraulic motor,
- * a drum for storing the retrieval cable,
- * a positive safety band brake, (e.g. will not release if hydraulic pressure is insufficient),
- * a positive safety disc brake.



The auxiliary system can only be operated from the control console on the ground.

3. Emergency system

The emergency system comprises:

- * a geared electric motor supplied either from the mains, the auxiliary system's generator or other external power supply,
- * a manual mechanical system for jaw clutching on the retrieval cable storage drum,
- * a release system for the main hydraulic motor.



The emergency system must be operated by a qualified person from the winch house.

- Control console

The control console comprises the following functions:

- controls:
 - * primary system (back-up in case of radio-control failure),
 - * auxiliary,
 - * mooring.
- signalling of faults and winch control points:
 - * initiate emergency stop,
 - * radio-control fault,
 - * top and bottom limit switches,
 - * phase reversal,
 - * electronic starter fault,
 - * over-speed,
 - * oil temperature,
 - * oil level,
- fire alarm,
- hour counter.
- a visual and an audible alarm indicating any major anomaly is installed in the ticketing house.



The console is installed within the winch house and so positioned that it is easily accessible from the control window panel.

- Running-in in the factory

Each winch is individually tested and run-in at the factory before delivery. It is operated by simulating the presence of the balloon using a mobile crane and a retrieval pulley. A weight is attached to the end of the cable and enables the winch to be tested in various load situations. The brakes in particular are tested separately under a load of 6 tonnes. The winch is then run-in, running a series of ascents and descents, to test all the retrieval system functions and components (primary, auxiliary and emergency).

- Certification and quality control

The winch was specifically designed from the outset to take account of the Bureau Veritas requirements and the strictest lifting standards for the carriage of people. Bureau Veritas, is an officially approved organisation in France for the certification of equipment to ensure that they meet all the required standards of health and safety.

The applicable texts are available on demand.

I. 10. Landing platform (patented)

The Aero30NG is delivered with a specific, patented landing platform. It comprises 24 elements forming an almost circular area about 10 metres in diameter. The central part is conical so as to:

- cover and protect the central pulley area,
- automatically re-centre the gondola as it lands (patented system).

The platform chassis comprises 24 metal supports. The structure is covered with durable non-slip marine plywood sheeting.



Landing platform in Paris

I. 11. Low mooring system (patented)

To withstand high winds (in excess of 20 m/s – 40 knots), AEROPHILE has developed a patented process called “low mooring”. It consists of lowering the envelope down to the gondola using the inner ring of electric winches directly below the equator.

This must be done practically and safely. The Aero30NG low mooring system was thus designed to be easily operated (in particular through its radio-control) and safe in high winds (in particular thanks to the mooring tables which allow tension to be kept in all the ropes and the winch safety systems).

The system comprises:

- a. 8 electric winches, each equipped with a switch and differential circuit breaker (which in particular protects the motor from overload).
- b. A radio-control able to operate each winch individually or all of them at the same time.
- c. A back-up control system on the control console.
- d. A safety system which stops ascent or descent if a winch fails.
- e. 8 vertical descent slings with a load rating of 5 tonnes each.
- f. 8 mooring tables, for stabilising the balloon laterally (preventing oscillation) during the descent.



Polyester cover



Electric winch

I.12. Spares

The Aero30NG can be delivered with a set of emergency spares in order to:

- rapidly correct any faults liable to endanger the passengers or the equipment,
- ensure that operations can continue while waiting for supply of a new part or repair of a defective part.

I.13. 300-metre (option)

The 300-metre option enables flights to be made up to a height of 300 metres (980 feet) above the ground.

This option comprises:

- a modification to the winch and its drive system, enabling it to accommodate the 300 metres of cable necessary,
- a lengthened cable of about 336 metres (depending on site),
- an on-board power supply system so that the balloon can be pressurised to counteract the significant atmospheric pressure differences between 0 and 300 metres above the ground.

I.14. Illumination (option)

The balloon can be lit from the inside by mean of a cylinder of bulbs composed of 3 bulbs 400 W each.

The summit valve is equipped with a special access door to make it possible to change the bulbs if burnt out. The bulbs cylinder is lit up from the gondola and illuminate the balloon from the inside, providing a glow effect.

The gondola is provided with all necessary controls.

The system can be powered from the network when the balloon is grounded, and at flight with a super silent generator.

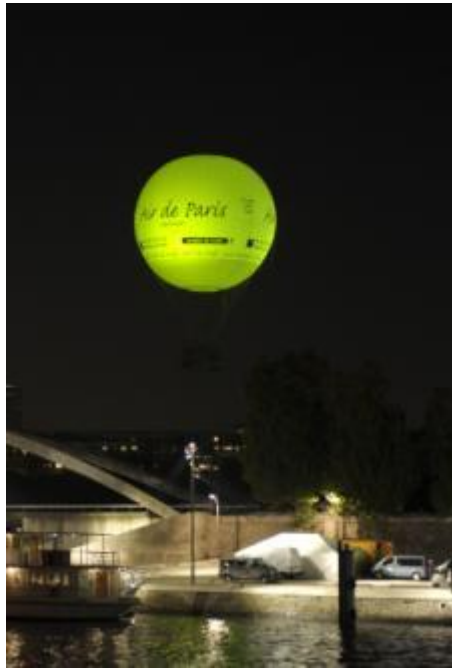


Eurodisney Paris balloon at night

I.15. Internal Projection (option)

The "Air Quality balloon" in Paris is working with a system that changes colour according to the level of pollution. Many different kind of use can be imagined.

The controls and power supply are located in the gondola.



Internal projection of "Air de Paris" balloon

I.16. Remote display and flight performance monitoring (option)

The data of the instruments are digitalized and displayed on a touch screen on board the gondola (see § I.7. Instruments). The Remote display and flight performance monitoring option makes it possible to transmit the data by Wi-Fi connection to the ticketing office and display on a dedicated PC. The data are displayed live and recorded.

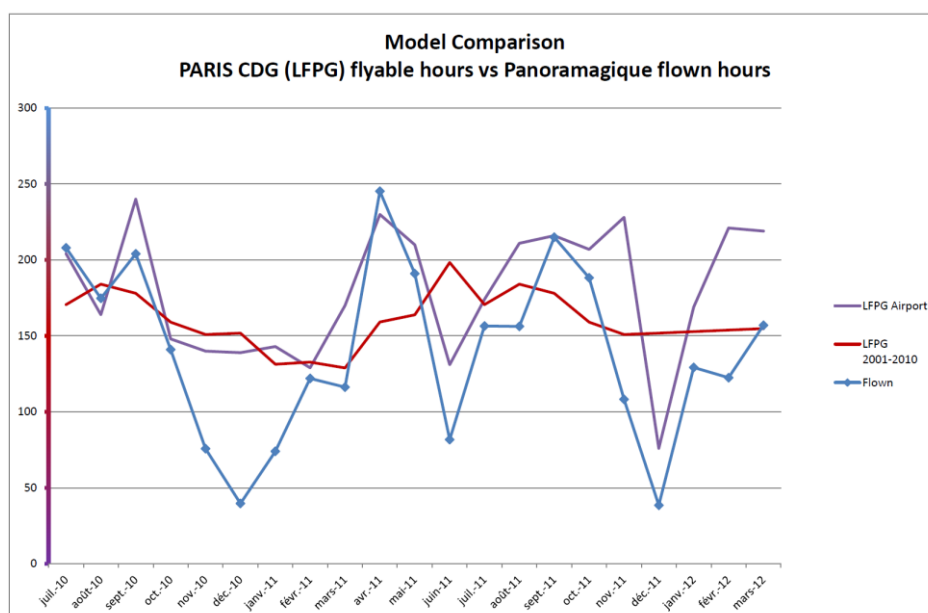
Adjustable alarms allow optimizing the periods of flight.

The data recording makes it possible to analyse the performance of flight and measure the technical capacity of the system, the weather factor and the performance of the team.

This system enabled to increase the number of passengers by 15%, at comparable weather (actual performance measured in Euro Disney between season 2009 and 2010).



Remote display of flight data in the ticketing office



Flight performance analysis month after month and in comparison with weather

II. OPERATION

II. 1. Start-up

From the high mooring position, which is the most common, the system can begin operations in just a few minutes.

The pilot is responsible for the flights and must:

- check the weather forecast from the relevant services,
- conduct a daily inspection on the balloon and the winch in accordance with the maintenance manual supplied by AEROPHILE,
- detach the 8 mooring ropes,
- activate the winch,
- carry out a test flight.

About 15 minutes are needed for this daily start-up procedure.

II.2. Commercial operations

The passengers normally purchase tickets from the ticket office and then approach the take-off area marked off with a safety barrier. When the gondola is secure on the landing platform, the pilot disembarks the passengers from the previous flight and takes on those for the next flight. He then locks the doors and makes the flight. The maximum number of passengers, who can be carried, in addition to the pilot, is 30.

This number will be reduced according to the maximum wind expected during the flight and this decision lies with the pilot. Generally speaking, the number of passengers decreases as the wind increases. A load curve given in the flight manual enables the pilot to accurately determine the number of passengers that can be carried safely and the flight computer will keep the pilot appraised of his situation throughout the flight. The number of passengers depends on their combined weight and on balloon lift (balloon helium fill and ambient temperature). The following table gives approximate figures:

Maximum wind gusts expected during the flight (speed read on the balloon's airspeed indicator)	Maximum number of passengers
5 m / s	30
8 m / s	15
13 m / s	8

When the operating period is completed or if the weather conditions deteriorate, the balloon is moored, see II.3.

II.3. Mooring

- High mooring

For winds not exceeding 40 knots (20 m/s), the balloon can be moored in the high position. This can be done by 2 people in 10 minutes.

- Low mooring

For winds exceeding 40 knots (20 m/s), the balloon must be moored in the low position. This takes 2 people 30 minutes.

- Deflation

For winds exceeding 60 knots (30 m/s), deflation of the balloon is recommended as a preventive measure. This can be done:

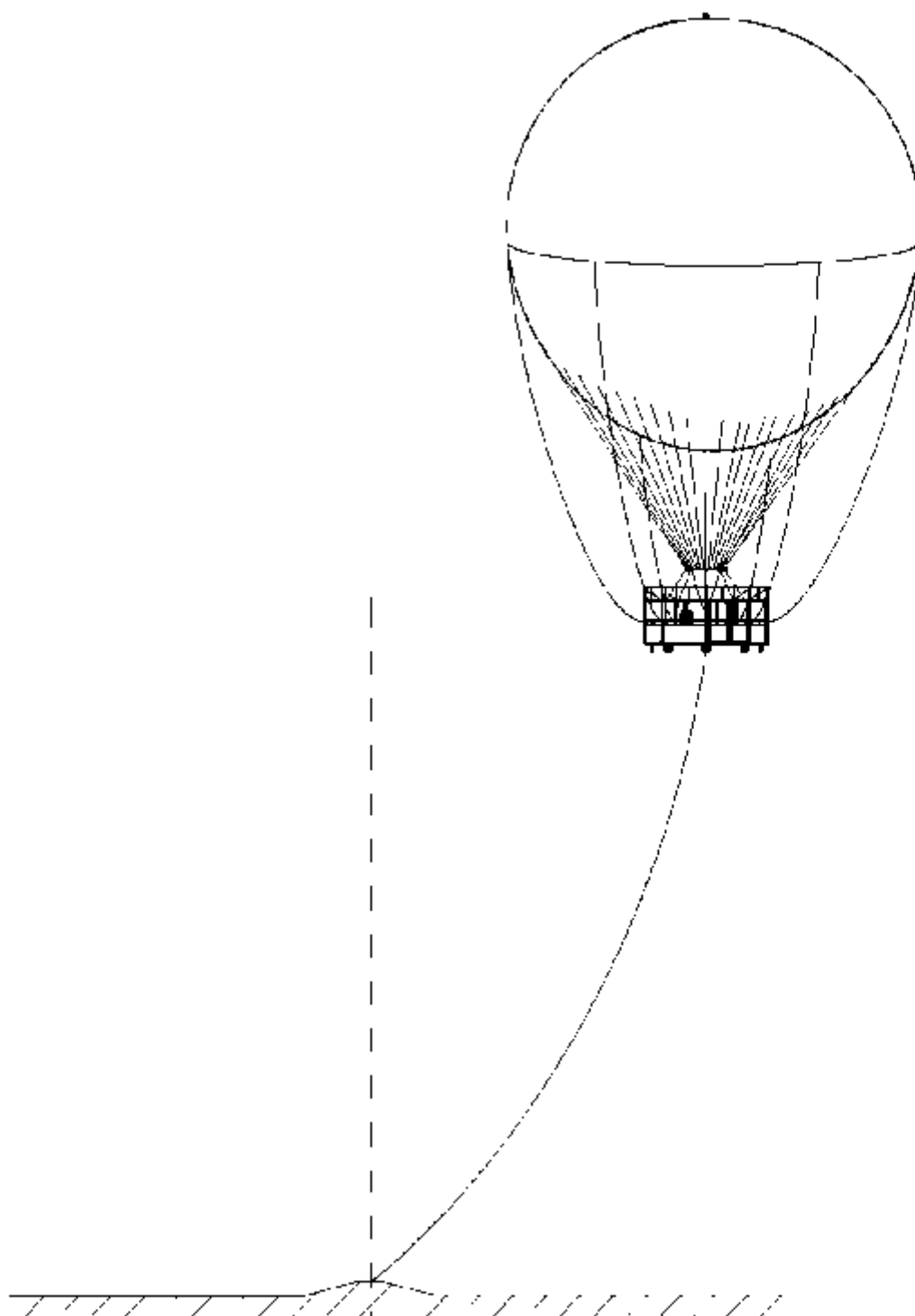
- * either through the top valve: wind speed lower than 5 m/s (10 knots), 2 hours,
- * or with the rip panel: wind speed lower than 10 m/s (20 knots), 2 minutes.

However, because highest gusts are usually difficult to forecast, it can be decided to keep the balloon inflated through a severe storm to save the cost of helium reinflation.

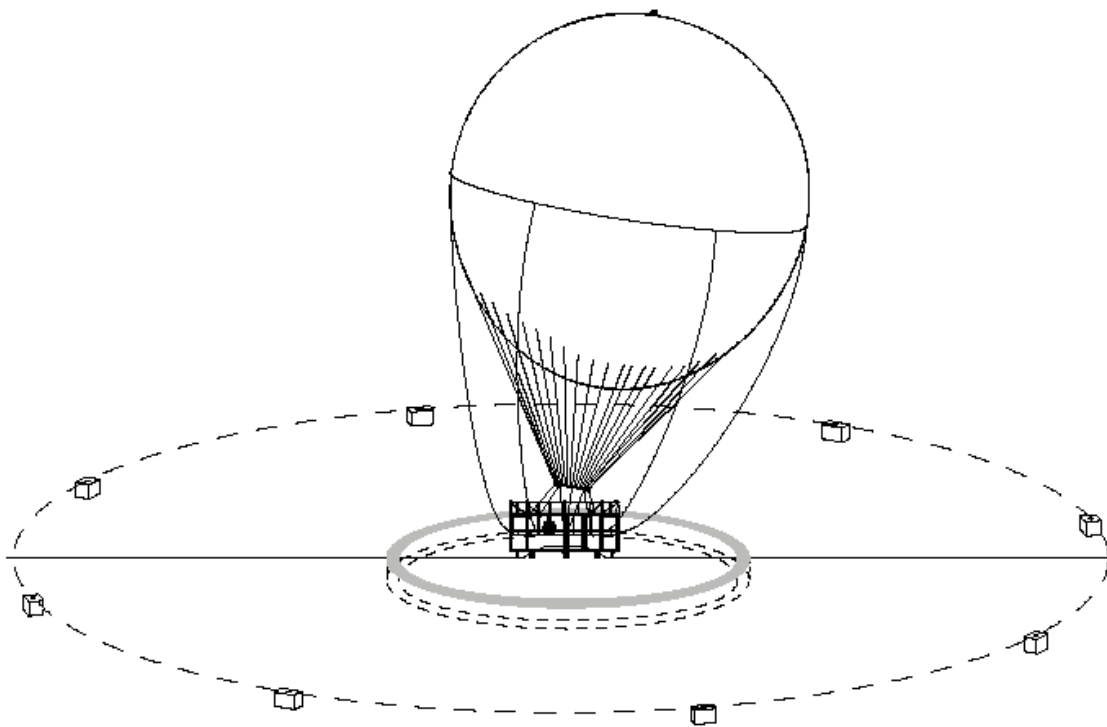
In low mooring, the Aero30NG has resisted to wind gust up to 37,5 m/s (135 km/h; 84 miles/h).

II.4. Operational and mooring modes

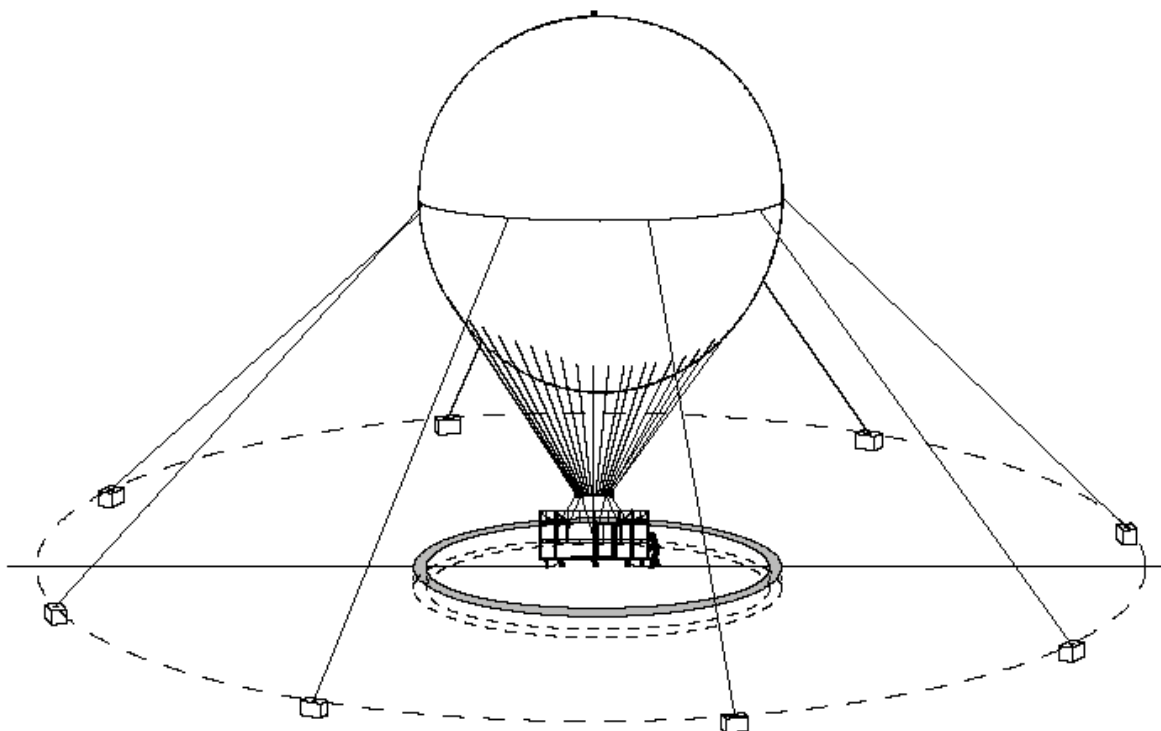
Aero30NG in flight



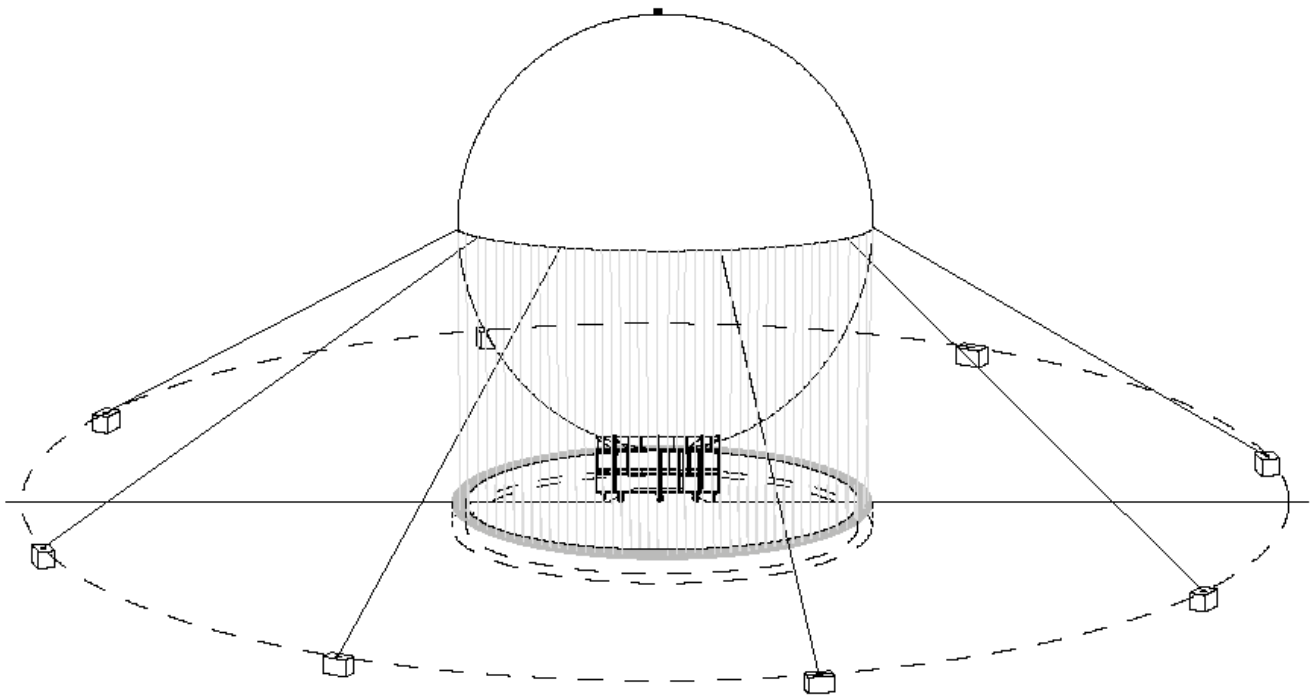
Aero30NG stand by position



Aero30NG high moored position



Aero30NG low moored position



II. 5. The effects of climate

a. Wind

Wind is the critical factor to the balloon's flying performance. When wind gusts exceed 20 knots (36 km/h), flights must be suspended. As already stated the balloon's payload capacity decreases as the wind increases. A site which is not subject to high winds is therefore recommended in order to optimise the number of flying days per year.

b. Humidity

Air humidity has little influence on Aero30NG performance. High humidity can make the fabric and net slightly heavier as they can become soaked with water, but this only reduces balloon lift slightly. High humidity can protect the fabric against UV radiation, and can thus be beneficial – see paragraph § II.5.d.

c. Temperature

High temperatures tend to improve the balloon's flying performance as they provide additional lift due to the helium expansion displacing the heavier air in the ballonnet. High temperatures have little effect on helium consumption. They slightly increase the porosity of the fabric. The main temperature-related problem is not so much due to very high or very low temperatures, but more to large temperature swings. Temperature changes lead to significant variations in the volume of the helium, which must be counteracted by expansion/contraction within the envelope ballonnet. The quantity of helium injected when inflating the balloon must be such that:

- the ballonnet is not empty when the outside temperature is high,
- the ballonnet is not full when the outside temperature is low.

The ballonnet of the Aero30NG is particularly voluminous and can handle daily temperature variations of 40°C (72° F). The limits for flight are -10° C to + 60° C measured by a sensor at the top of the balloon.

d. Ultraviolet radiation

Ultraviolet radiation is the most destructive agent responsible for ageing and degradation of the fabric. The AEROPHILE fabric is particularly well protected against UV rays by its exterior coating. A good example of our fabrics resistance to UV is the Aero30 envelope in Berlin (Germany) which has operated for 11 years with low porosity. Other balloons proved long operation under very sunny climate:

e. Precipitation

The balloon can fly in the rain when the wind is within normal limits and there is no chance of instability due to storm clouds. The lift is diminished slightly by the weight of water on the fabric and net. Heavy snowfall represents a danger to the system. The weight of any snow accumulated on the balloon can seriously affect its ability to fly. A heavy build up of snow can place the envelope in danger by pressing it onto the gondola. It is important to clear the snow and avoid any accumulation. In areas with severe winters or places subject to heavy downfalls, it is recommended that the envelope is deflated for the winter. However, some balloons proved to pass strong winters with no problem, like Berlin and Hamburg (Germany), Conner Prairie (Indianapolis) and Istanbul (Turkey)

f. Altitude influence

An increase in altitude causes a loss of lift from the helium which affects the performance of the balloon. It is advisable to avoid locations at high altitude, particularly those above 1000m (3000ft) above sea level.

g. Weather analysis

AEROPHILE advises the potential operator to undertake a weather analysis of a site pre-selected for installation of an Aero30NG. The operator usually has a good idea of the temperature and sunshine data, which are linked to the seasonal nature of tourism in the region: stable all year-round, or with high and low seasons. Wind data is often harder to quantify, but is vital to the profitability of the operation. Statistical data allows a specific analysis to be conducted and is often available from the local meteorological office.

AEROPHILE recommends that the analysis should be done by an experienced meteorological consultant to determine:

- the number of expected days flying per month and cumulated on the whole year;
- the risk of having to deflate the balloon during any season due to high winds.

AEROPHILE can also provide its general available wind data for any region in the world or a specific study for a pre-selected location.

The following table summarises the positive and negative factors:

	OPERATION	HELIUM CONSUPTION	LIFE SPAN
a. Low wind	+++	+	+
b. High humidity	-	+	+
c. High temperature	+	-	●
d. Strong UV radiation	+	-	--

- | | | | |
|-----|-------------------|-----|-------------------|
| ● | no influence | + | slightly positive |
| - | slightly negative | ++ | positive |
| -- | negative | +++ | very positive |
| --- | very negative | | |

II. 6. Emergency procedures

1. Failure of the primary winch system

If an anomaly is detected on the winch's primary system, the ground crew starts up the winch auxiliary system. The balloon is returned to the ground using the auxiliary system. Operations must be suspended until the anomaly detected on the primary system is remedied.

2. Failure of the primary system and auxiliary system.

If there is a simultaneous failure of both the primary and auxiliary system, the balloon can be returned to the ground using the emergency descent system. This procedure requires supervision by a technician who has undergone special training as provided by AEROPHILE.

3. Deterioration of weather conditions

If the weather conditions deteriorate, in particular if the wind increases significantly, or if there is a risk of storms, operations should be suspended. The balloon must be moored according to the maximum winds, as stipulated in § II.3.

4. Retrieval cable break

The envelope will not burst, and will return to earth with a terminal velocity that should not prove life threatening. The pilot has at his disposal a number of controls that will limit the potential altitude of free flight, and make it possible to initiate the descent. He also has the option via the main helium valve to initiate an increased rate of descent into a safe area and a rip panel to ensure that the balloon does not drag or bounce after landing.

II. 7. Decoration/Artwork

1. Coated color

Coated fabric used for the balloon can be pigmented with various colors. We suggest the use of light colors (yellow, orange, white ...) because of the reduced absorption of UV and heat radiation which effects durability and performance of the envelope.

The pigments provide a mass color which is very resistant and even which provides very impressive results especially for night illumination. The balloon can be patchworked with different colors respecting the template of the balloon gores assembly.



Eurodisney made of yellow and red fabric



Shenzhen made of six different colored fabric

2. Painting

The balloon fabric is best painted in the workshop during construction. The paint is specifically designed for the balloon and offers a high degree of strength and durability with minimum of weight.

Painting offers the following advantages:

- the entire surface of the balloon can be used,
- the weight of painted artwork is minimal, even for a large surface area,
- very good durability.

Painting involves the following constraints:

- it must be defined before final construction of the balloon, so that it can be produced segment by segment, before the balloon is finally assembled,
- it is irreversible (but can be subsequently painted over).



Ocean Park – Hong Kong



Paris – France



Sousse –Tunisia



Angkor Vat – Cambodia



Singapore



Berlin - Germany

3. Banner

Banners are manufactured in segments that conform to the shape of the balloon. They can be of any size and either painted, applied or printed.

AEROPHILE suggests the use of standard size banners:

- 10 x 15 m (33 x 49 ft) around the central part (equator), of the envelope, up to 3 times over the circumference,
- 5 x 2 m (16 x 6,5 ft) in the lower part, up to 3 times over the circumference.

Banners offer the following advantages:

- they can be easily replaced, at intervals of from once a year to once a month. Banners can be replaced with the balloon inflated but, depending on the size and location of the banner, require time and lifting/man riding platforms.
- they can be manufactured independently of and at the same time as the balloon envelope.

They do however involve the following constraints:

- their cost, which includes the cost of the material itself, making up the banner and customisation (painting or printing);
- an extra weight of about 100 g/m² (9,3 g/sq ft);
- limited durability;
- creases can be visible.



Indianapolis - USA



Hamburg - Germany

4. Gondola

The gondola consists of an aluminium structure protected by grey paint, and polyester sections which are grey on the inside (gel-coat) and blue on the outside.

- Custom colours are available on request.

It comprises 8 sections, one of which contains the 2 access doors. Its exterior panels can be decorated with special weatherproof stickers, which we can be designed and cut or printed. The whole structure of chassis and panels can be painted in order to fully customise its appearance.

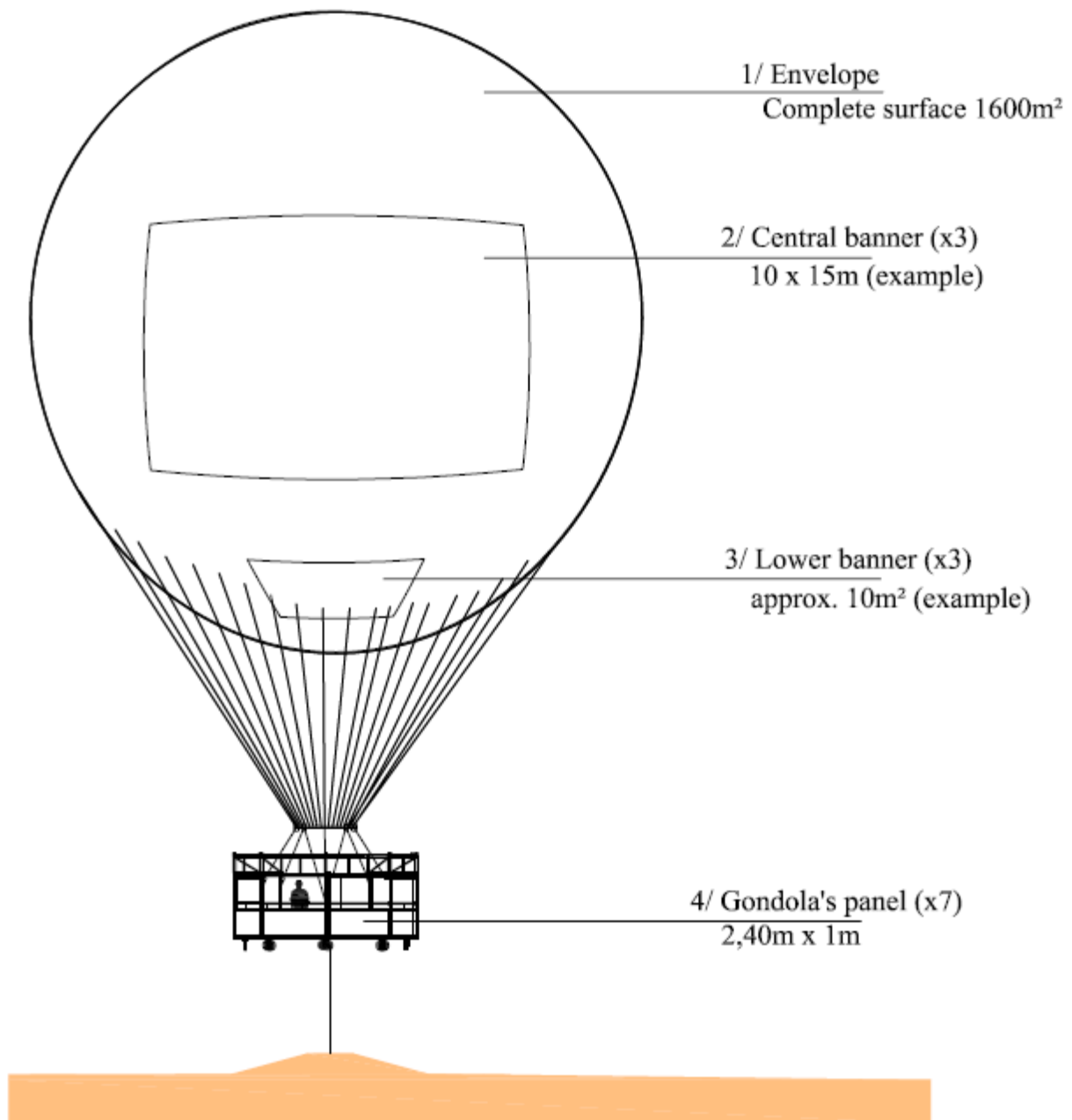


Gondola with stickers



Gondola completely painted

Different sizes of advertising surfaces



II. 8. Documentation

Aeronautical certification of the Aero30NG is accompanied by detailed documentation certified/authorised by the competent authorities. This documentation is a valuable source of information for the operator, who can refer to it to find out about or check system operating and maintenance procedures. This documentation also includes the manufacturer certificates (release document) guaranteeing the quality of the equipment and the responsibility of AEROPHILE.

This documentation comprises:

- the balloon flight manual: description of the equipment, normal operating and emergency procedures;
- the balloon maintenance manual: with details of periodic checks and balloon maintenance;
- the operating and maintenance manual for the handling equipment: description, normal and emergency procedures, wiring, mechanical and hydraulic diagrams, periodic checks and maintenance of the winch and the low mooring winches;
- the technical installation specifications, detailing recommendations for construction of the civil engineering infrastructure;
- the certificate of airworthiness: export certificate for any country or individual certificate available in France, Germany, Australia, Italy and Austria.

II. 9. Maintenance

The maintenance and servicing operations are described in detail in the documentation supplied by AEROPHILE and in particular in the balloon and handling equipment maintenance manuals. The design of the Aero30NG means that very little servicing is required. However, the preventive checks defined in the periodic inspections must be carried out with great thoroughness. The training given by AEROPHILE also comprises training in maintenance operations.

The checks mainly comprise the following operations:

- Daily, weekly and monthly checks can be carried out by the pilots and include:
 - * a detailed visual check on the system components,
 - * a check on the correct working of certain system functions,
 - * a check on the various fluid/oil levels.
- The quarterly check also requires drainage of the hydraulic reduction gear oil (5 litres) and can be carried out by the pilots or a hydraulic maintenance company after training by AEROPHILE.
- The annual inspection comprises a tensile test on a sample of fabric and net, performed by AEROPHILE free of charge throughout the life of the balloon, plus an analysis of the hydraulic oil to be carried out by a laboratory as recommended by AEROPHILE.
- Every 3 years, an approved company or agency must carry out an X-ray inspection of the cable. This involves a portable inspection device being deployed on site.

III. INSTALLATION

III. 1. Site required

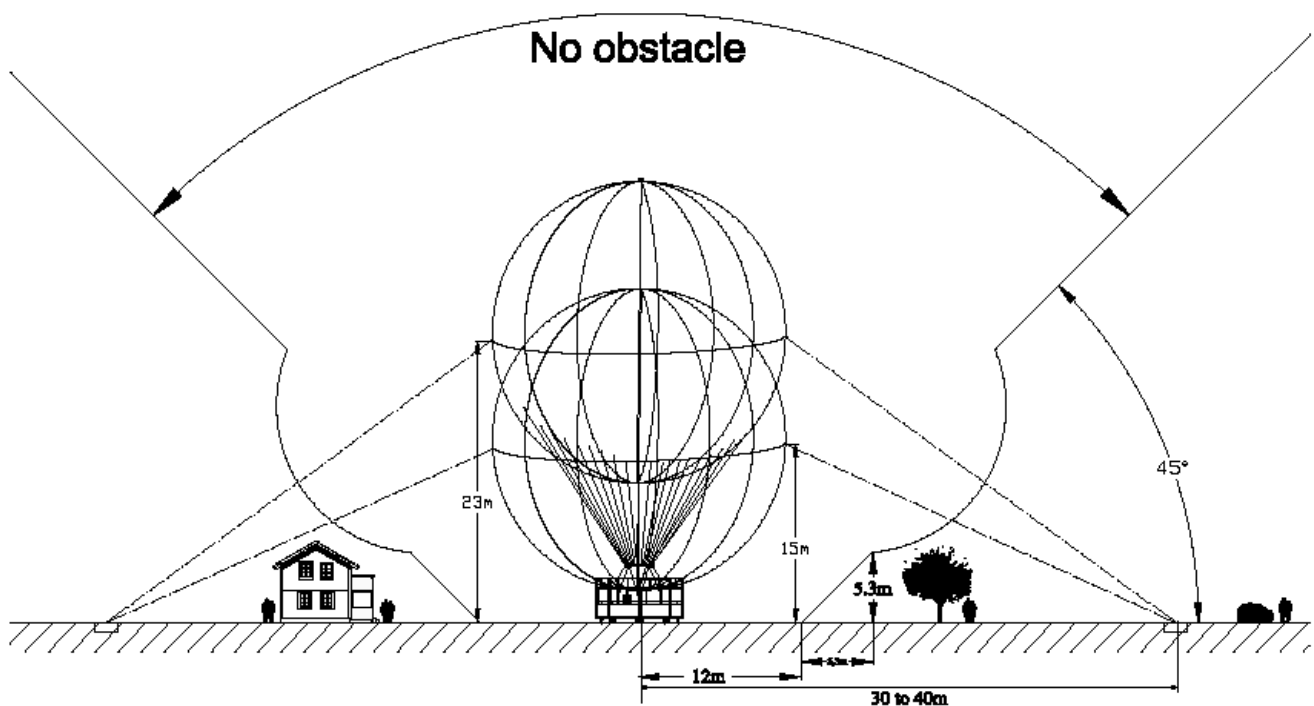
The site required for the balloon must comply with the following recommendations:

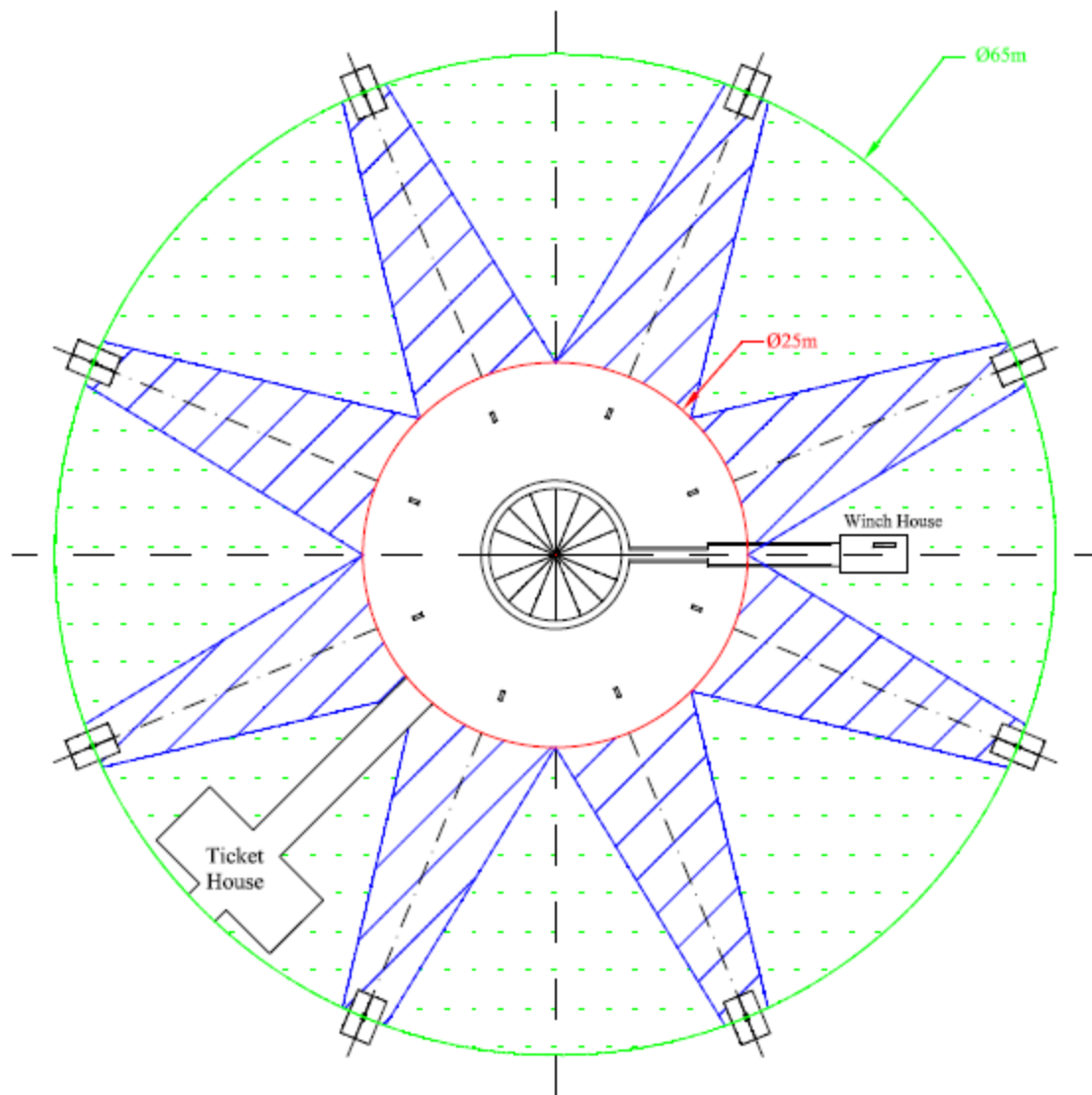
- a clear area 60 m (196 ft) in diameter. This area can include the installations needed for operation of the balloon (ticket office, barrier, etc.) and low vegetation, provided that the 45° aeronautical cone is left free. See diagram.
- the 60 m diameter can be reduced to 48 m (158 ft) in certain conditions. See details and implications for the balloon operating limits with AEROPHILE.
- must be approximately flat:
 - * perfectly flat over a central diameter of 20 metres (66 ft),
 - * less than 3 metres level difference over the 60 m (196 ft) diameter.

Sloping ground can be suitable in certain conditions. Check details with AEROPHILE.

If the site does not meet these conditions, it is possible to install the “Aeronest®” (please contact us for more information) or a system of mooring poles to compensate for the relief.

Aero30NG site requirement:





-  Open to the public under supervision of operator for safety inflation or emergency deflation
-  Mooring Area.
 - No construction allowed.
 - Operator must be able to clean this area quickly for mooring operation
-  Flight area / Boarding area.
 - Must be closed and without construction



Eurodisney – installation on water



Paris – installation on ground

III. 2. The necessary preparation work

The preparation work is the responsibility of the balloon operator. AEROPHILE provides detailed recommendations and technical details for the construction of the ground works needed for balloon operations. This work comprises:

- The concrete anchors:

- * 8 exterior mooring blocks in a circle 70 metres (230 ft) in diameter. Approximate concrete volume = 4 m^3 (142 cubic feet) for each block;
- * an interior mooring ring, in a circle 19 metres (62 ft) in diameter. Approximate concrete volume: 24 m^3 (850 cubic feet);
- * a raft for anchoring the central pulley. Approximate concrete volume = 6 m^3 (212 cubic feet);
- * a raft for anchoring the winch house. Approximate concrete volume = 7 m^3 (247 cubic feet);
- * 48 base slabs for the landing platform;
- * a cable way (duct) with removable cover to protect the retrieval cable run between the winch house and the pulley.

Remark: concrete foundation anchors can be replaced by a system metallic ground anchors. Please contact Aerophile for details.

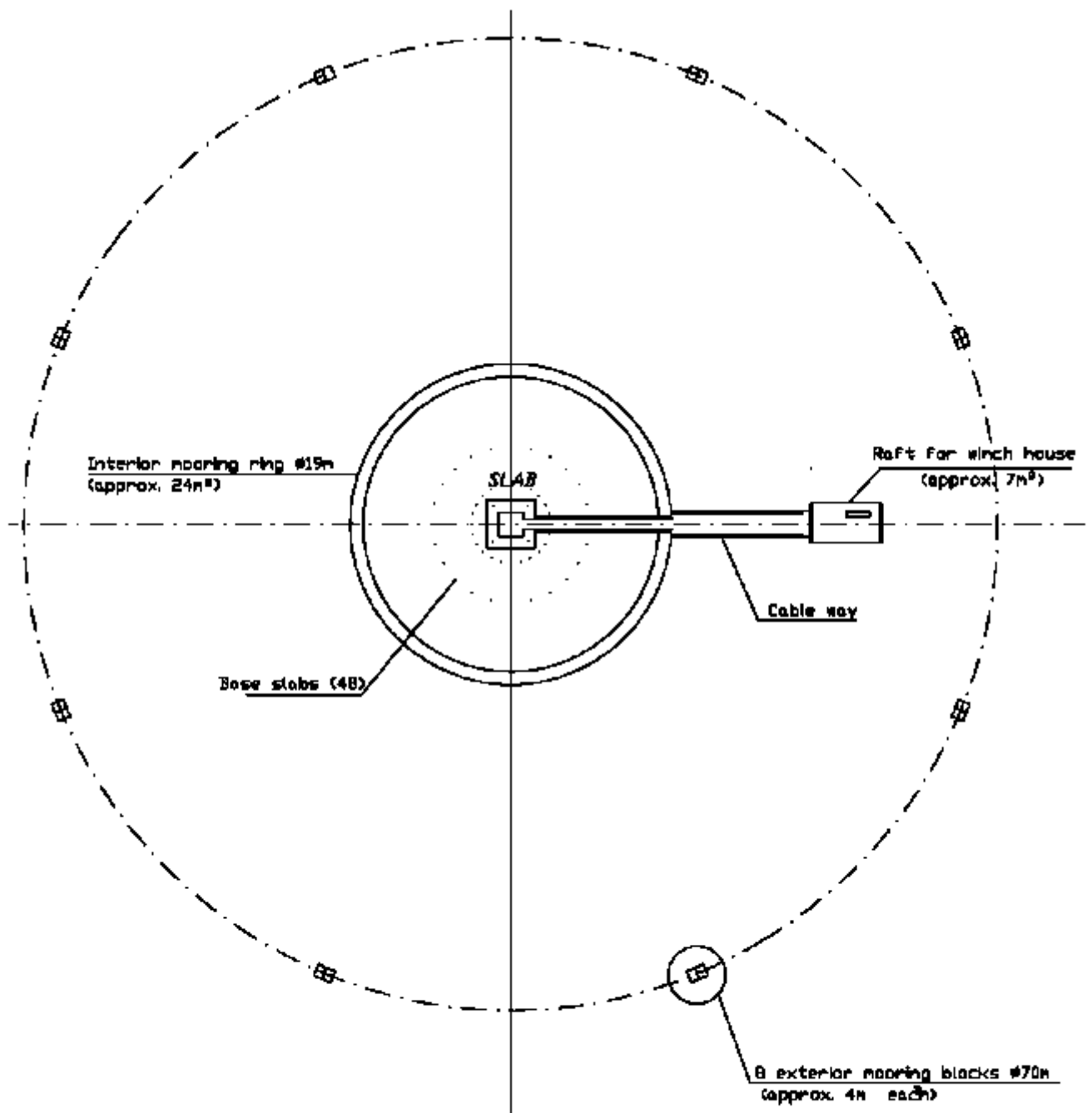
- Connections:

- * Electricity supply: allow for 45 kVa for the winch house alone. 3-phase supply according to the locally available standard (3 x 400 V, 120 Amp, 3 x 220 V, 220 Amp...);
- * provision must also be made for power for the electrical peripherals (outdoor lighting, ticket-office, heating, etc), for earthing, with a resistive capacity of less than 50 Ohms;
- * connection through buried ducting:
 - station to 8 mooring winches: 8 ducts (dia. 50mm),
 - station to ticketing: 1 ducts (dia. 50mm),
 - station to central pulley: 1 duct (dia. 150mm),
 - station to interior mooring ring: 1 duct (dia. 150mm),
 - provide additional ducting for the electrical peripherals (outdoor lighting, etc.).
- * rain water drainage from the central pulley.

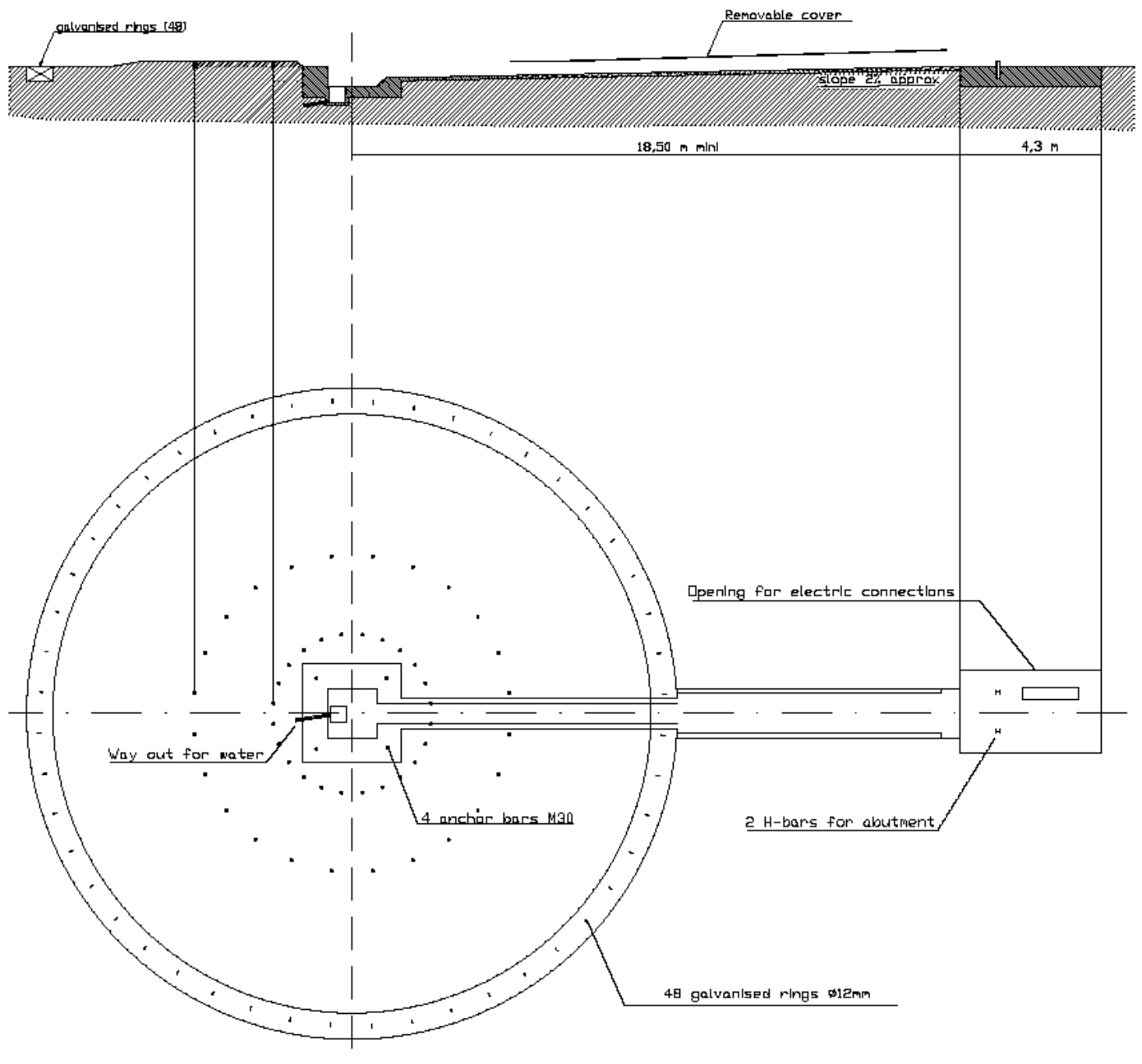
- Facilities:

- * access path, including patch for watchman around the take-off platform,
- * construction of a structure for the public and technical areas.
The following various functions must be provided:
 - ticket office and souvenir shop: allow for $20 \text{ to } 40 \text{ m}^2$ (200 to 400 square feet),
 - pilot and hostess area: allow for 10 m^2 (100 square feet),
 - store room/workshop area for spares, etc: allow for 10 m^2 (100 square feet),
 - as applicable: toilets and room for night watchman.
- * barrier: prevents the public from accessing the platform and allows passenger flow control. Minimum diameter = 15 metres (50 ft).
- * outdoor lighting: for access to the balloon for night flights and envelope illumination.

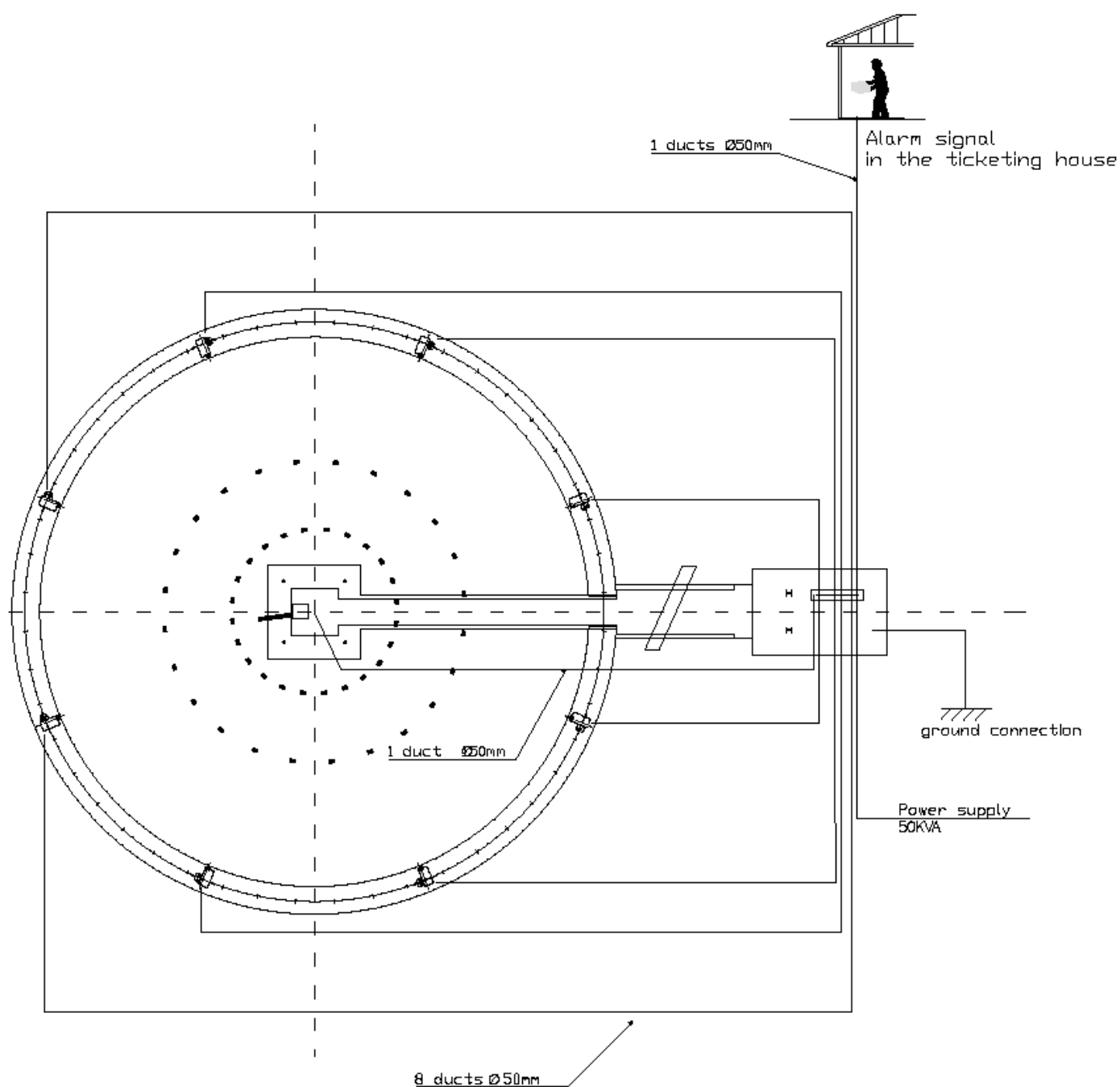
Aero30NG: concrete anchor



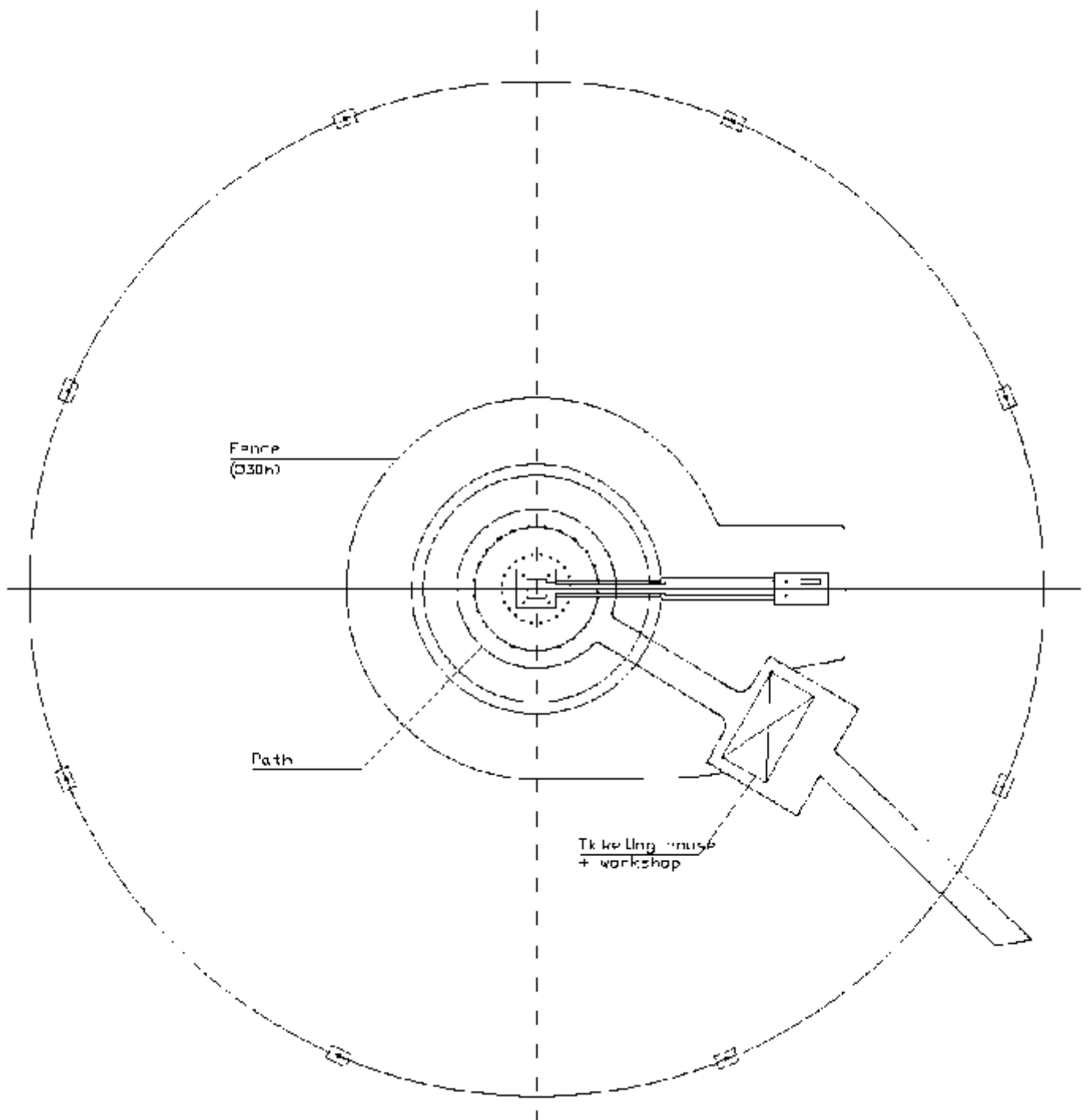
Aero30NG: concrete anchor, central part



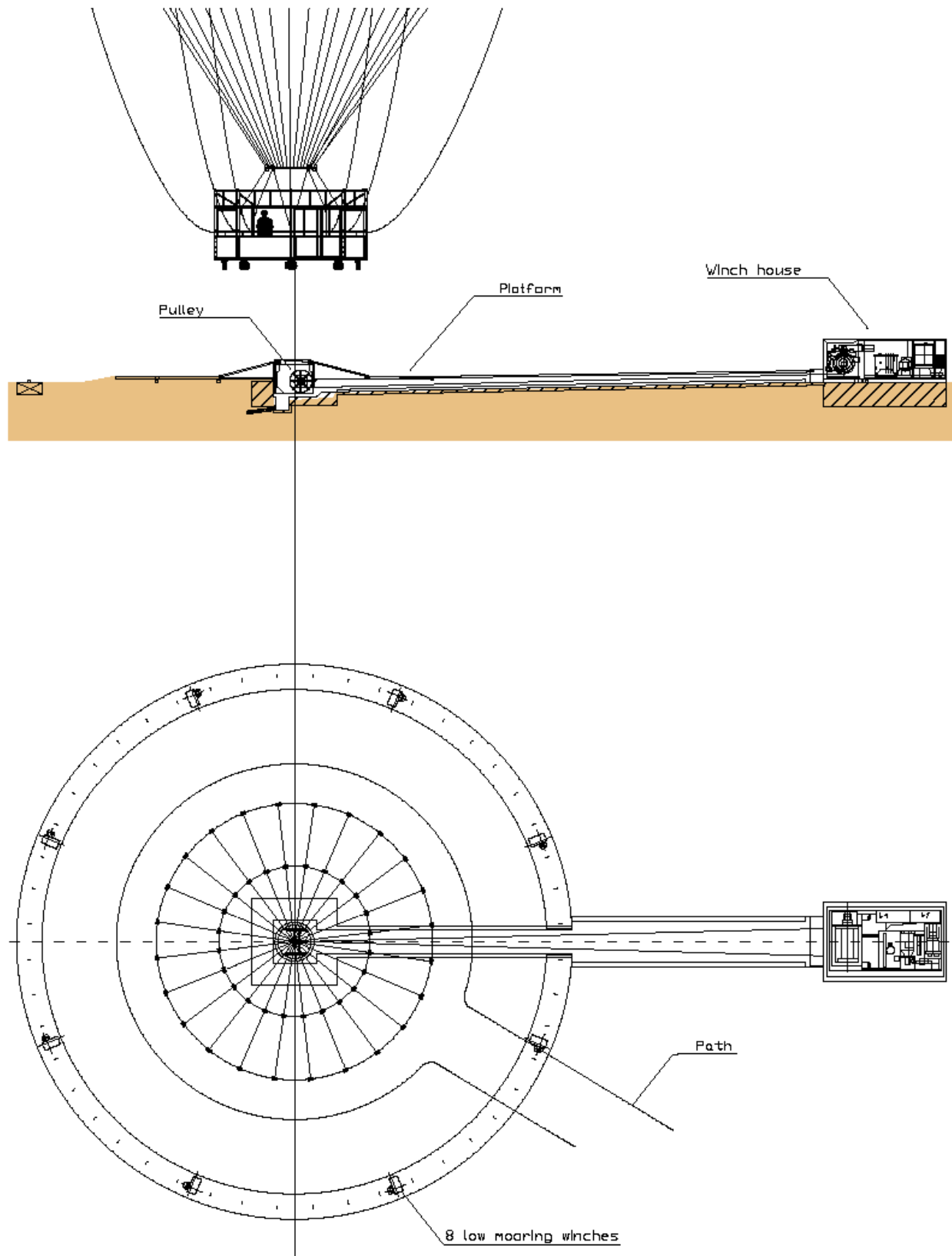
Aero30NG: electric connection



Aero30NG: facilities (example)



Aero30NG: installation



III.3. Operating Platform©

The elevated operating platform is designed to facilitate the normal operation of the Aero30NG tethered gas balloon over areas that would otherwise be unsuitable such as rivers, lakes or uneven ground where levelling and landscaping is not practical. Once constructed, the elevated platform permits:

- The normal installation of all the handling equipment of the Aero30NG system: E.g. Main winch house, central pulley, landing cone, low mooring winches, etc;
- Preparation and Inflation of the Aero30NG in situ;
- Safe operation of the Aero30NG;
- Access and exit paths for passengers;
- Normal mooring of the balloon in high and low position;

The NG Platform is an octagonal structure based around a main chassis consisting of eight main braces, (arms) extending to a distance of 30m from the centre. Mooring operations are carried out without the requirement for the operator to move any further from the centre than the mooring winches module.

A similar platform is installed and operating at Euro Disney, close to Paris. It is constructed on an artificial lake bed that could not be punctured, and stands in 3m (or 10ft) of water. Another one is operating in Downtown Disney in Orlando, in a natural lake, and is made of steel and wooden piles holding a concrete floor.



Euro Disney platform

III. 4. Aero30NG services

AEROPHILE is both manufacturer of the Aero30NG, and also an operator of the Aero30NG at several sites. The customers are thus provided with a complete range of services as well as both technical and commercial assistance.

* Before the order is placed, AEROPHILE proposes the following services:

- technical, administrative and commercial information,
- An invitation to visit an operational Aero30NG site managed by AEROPHILE, for example at the André Citroën Park in Paris, at Disneyland® in Paris or at the Walt Disney® World Resort in Orlando (Florida) or at the Great Park, in Irvine (California),
- conformity visit to your site selected for installation of an Aero30NG,
- assistance with a view to obtaining the necessary administrative authorisations,
- estimate of weather conditions according to the data provided concerning the pre-selected operating site (AEROPHILE could supply a complete weather analysis),
- proposal of a specific sale contract precisely defining the obligations of the Buyer and Vendor, price and delivery.

* When you place your order, AEROPHILE provides:

- technical assistance for the preparation work,
- documentation: see § II.8.
- installation of the system on site (excluding travel and accommodation expenses),
- supervision and monitoring of the inflation operations,
- performance of test flights and adjustments,
- training of the operating personnel,
- permanent technical assistance and a 1-year parts and labour warranty covering the entire system.

* During the life of your Aero30NG, AEROPHILE proposes the following services:

- site visit for diagnostic and troubleshooting: AEROPHILE is usually able to provide a specialist Aero30NG technician within 48 hours anywhere in the world,
- periodic inspection of system status, check-ups and servicing,
- assembly, disassembly, transport, storage, overhaul of all or part of the Aero30NG system,
- production of banners or modification of a painted decoration/artwork,
- assistance in case of deflation and re inflation.

III. 5. At the expense of the customer

The customer will receive help and assistance from AEROPHILE but is responsible for:

- obtaining local commercial and technical administrative authorisations,
- carrying out the civil engineering preparatory work,
- transportation of the Aero30NG from our factory: G nelard, France (71), to site.
- any customs formalities for import into the country of operation,
- storage and handling facilities on the site,
- transport and accommodation for our installation and start-up team,
- the personnel needed for inflating and then operating the balloon.

III. 6. Installation and start-up

The Aero30NG service includes assistance with assembly and start-up on the operating site.

The service can be broken down as follows:

- during construction of the civil engineering infrastructures: conformity visit: 1 engineer, 1 day;
- once the civil engineering work is completed, performance of installation operations: 2 technicians, 5 days;
- once installation is completed, performance of inflation, adjustments, checks and test flights: 5 to 7 people, 5 days (subject to weather);
- once start-up is completed, personnel training: 1 instructor, 2 weeks.

Note: AEROPHILE recommends that personnel training be prepared before system installation, through a pilot training course on one of the sites operated by AEROPHILE. This training course enables the personnel to familiarise themselves with the system before their own Aero30NG is installed.



Loading of standard main winch



Inflation process at Eurodisney

III. 7. Helium

The Aero30NG may only be inflated with helium. Helium is a totally inert rare gas: it is neither flammable nor explosive. It is odourless and colourless but it is nonetheless a hazard if inhaled and can cause asphyxiation.

Helium comes from natural gas sources which are mainly to be found in the United States, Poland and Algeria. Helium is normally packaged in gas form in standard metal cylinders, pressurised to 200 bars.

It can also be packaged in liquid form, cooled to -250° C. A ventilation tower is then needed to heat it and convert it into gas before inflating the balloon.

The main suppliers are:

- **AIR LIQUIDE**
- **AIR PRODUCT**
- **LINDE**

and their local subsidiaries.

The price of helium, delivered on site, varies from 5 to 7 euros per cubic metre.



Helium truck

Helium supply must comply with the following characteristics:

- minimum volume available on site: 6 200 m³ equivalent at 15°C,
- minimum flow rate for full inflation process: 1000 m³/hour,
- minimum purity of helium: 99,9 %.

We recommend negotiating with the supplier for the supply of 6,500 m³, and payment only of the part consumed. It is also necessary to negotiate the availability of trucks: notice required prior to delivery and the waiting time allowed on the site for gas discharge, as inflation is in fact dependent on the weather and can be postponed for a number of days.

The Aero30NG is supplied with an inflation sleeve (30 m long) and a standard 1/4 turn coupling for connection to the gas trucks. AEROPHILE can send this coupling separately in order to check that the necessary connections/adaptors are available from the helium supplier before delivery of the balloon.

We also recommend having independent mean to measure the temperature and the pressure of each tank before and after inflation.

III. 8. Insurance

Operator insurance:

- Civil liability insurance must be taken out by the operator. This covers any damage that may be caused to third parties, in particular if a passenger is injured. The injured party may obtain reparation from the operator's Civil Liability insurance.
- Damage insurance can also be taken out by the operator (highly recommended). This covers the operator for any damage caused to his/her own equipment, for example by a storm, fire or act of vandalism. The operator will then obtain compensation for the cost of repairs. This insurance can be subscribed with flying part (aeronautical insurance) and ground part (engine breaking) because of different rate.
- Loss of operations insurance enables the operator in certain conditions to receive a loss of earnings compensation if operations are stopped by an accident.

III. 9. Transport

The entire Aero30NG system can be transported in two 40-foot containers, including one with an open-top.

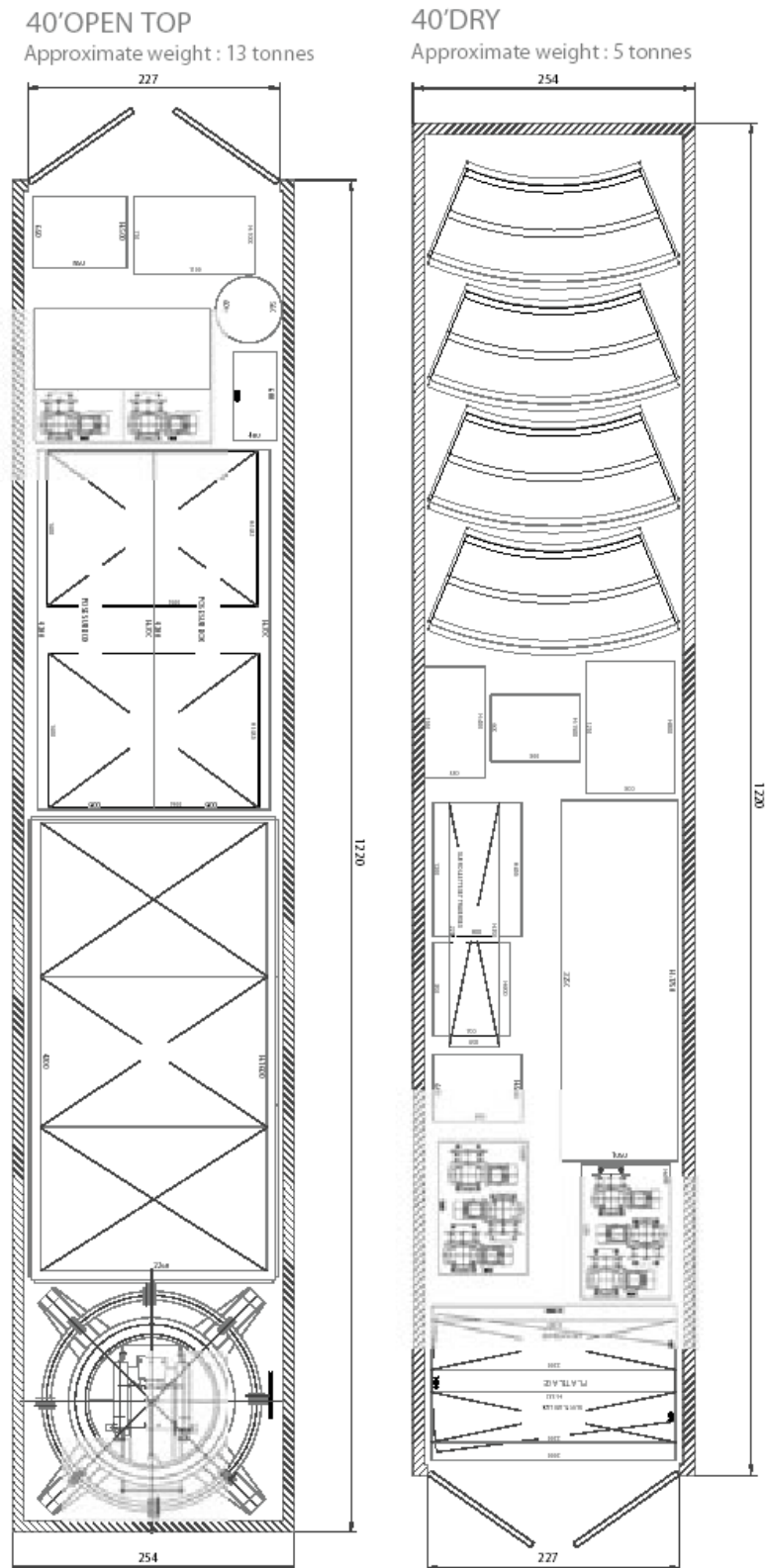
The balloon (excluding gondola) is packaged into 2 wooden crates supplied:

- * 1 crate: 1.66 m x 1.50 m x 1.70 m (high), 1,1 tonne for the envelope ;
- * 1 crate: 1.60 m x 1.40 m x 1.40 m (high), 900 kg, for the net and equipment.

The gondola is delivered dismantled, with the polyester elements and the aluminium structure separated. This enables the balloon part of the Aero30 to be very easily transported by air, land or sea to anywhere in the world.

AEROPHILE will oversee the loading of the 2 containers at our factory (Located at Genelard France 71). Unloading on site is the responsibility of the client.

Packing drawing



IV. CERTIFICATION AND PATENTS

IV. 1. Certification

The Aero30NG was initially developed and certified in France where it is considered to be an aircraft. Certification as an aircraft required the greatest care with the selection of materials, technologies and inspections used in the construction of the system.

After 2 years of work and a series of test flights, the Aero30 received certification in France in 1994.

The certification basis is:

- for the flying part, the internationally adopted FAR PART 31, the FAA's federal aviation regulations concerning manned balloons,
- for the handling equipment part, a series of French and European standards defined by the inspection and control agencies. See § I.9.

Since then, the Aero30 has received certification, without modification:

- in 1996: in Germany, China and Australia;
- in 1997: in Japan;
- in 1998: in the United States;
- in 2000: in Austria;
- in 2001: in Italy;
- in 2002: in Switzerland and Cambodia;
- in 2003: in Belgium and Turkey;
- in 2004: in Lebanon, in Portugal, Canada, United Kingdom, and South Korea;
- in 2005: in California;
- in 2006: in Singapore and Hong Kong;
- in 2007: in Dubai;
- in 2008: in China;
- in 2009: in Yemen;
- in 2010: in Vietnam;
- en 2012 : en Thaïlande;
- en 2014 : en Irak et aux Philippines.

Depending on the country, the certification basis was either aeronautical standards or safety criteria normally applied to fairground attractions. As international aeronautical standards carry considerable weight, they allow smooth and virtually automatic extension of certification into new countries.

IV. 2. Patents

AEROPHILE holds two patents:

- conical landing platform: patent No. 9315709,
- low mooring system: patent No. 95904567.

Purchase of an Aero30NG includes a licence for use of these patents.

Caution: AEROPHILE wishes to warn the operators that certain balloon systems can use these patents unlawfully. Some users of such breaches of patent have been forced to pay AEROPHILE damages for the unlawful use of its patents.

IV. 3. Test and quality control

- Test of the fabric

The fabric is specially coated with a Polyurethane film on both sides. The film, the lamination and the final fabric are carefully inspected. Samples of the fabric and welding are tear tested in house and kept for record and proof of the good quality of the fabric and its assembly.

- Test of the net

Samples of the net are tear tested in house.

- Test of the instruments

The whole equipment and instruments (fan, valve, openings, sensors, all electric wires, instrument panels...) are connected to a wooden box to simulate the balloon, and goes through intensive run test. Hence any failure or weakness can be corrected before shipping and inflation of the balloon.



Test of the instruments

- Test of the gondola

The gondola is fully assembled and tested with the maximal load + 50 %.

The gondola is painted and packed for transport after the test.



Test of the gondola

- Test of the winch

The winch is extensively tested at factory with a crane, pulley and loads to simulate the balloon movement.

The 3 different ways to bring back the balloon (main, auxiliary, emergency) are tested with max load + safety factor.

All safety devices (auto end switches, controllers, automate...) are tested.

The brakes are also tested separately with full load + extra safety factor.

The mooring winches and remote controls are also tested.



Test of the winch

V. COMMERCIAL OPERATIONS

V. 1. Personnel

The number of employees needed to operate the system depends to a large extent on the particulars of the site. There are three types of personnel: the pilots, the ground crew and the surveillance personnel.

1. The pilots

For the system to operate, a pilot must be on-board the balloon. The necessary qualifications depend on the country. AEROPHILE is qualified by the French Aviation Authority (Direction Générale de l'Aviation Civile) to issue a Proficiency Certificate "DNC".

For example: in France, Germany, Austria and Australia: balloon (gas or hot air) pilot + DNC.

In Italy, the United States, China, Lebanon and Japan: "DNC".

If the site receives large numbers of visitors, it would be preferable for two pilots to be permanently present so that they can alternate with each other and have the necessary time to keep watch on the weather.

2. The ground crew

A qualified person on the ground must be present at all times when the balloon is operating, so that he/she can if necessary lower the balloon in the event of a failure and monitor the vicinity of the site for intruders or vandals. This person can also look after ticket sales and make visitors welcome.

If the site receives large numbers of visitors, at least two people will be needed: one at the ticket office and one at the waiting area. Staff will also be needed if there is a souvenir shop.

3. Surveillance personnel

We advise supervision around the clock for the balloon to prevent any malicious acts and so that the necessary steps can be taken in the event of a sudden deterioration in the weather. Surveillance, especially at night, can be subcontracted out to security companies, but they must nonetheless receive training in certain specific aspects of the system. It can be done with an "external alarm system".

4. Exceptional operations

For inflation:

- preparation: fifteen people for a half day,
- actual inflation: thirty people for half a day.

For deflation, fifteen people are needed for half a day.

V. 2. Ticket sales

1. The four keys to success

The commercial success of a site depends primarily on four factors:

- Weather

Not only is it necessary to examine the general weather picture in the region or country (tropical, Mediterranean, oceanic, climate, etc.) but also the balloon's local position in relation to high ground, the environment and thermal contrast.

- Catchment area

Study whether the site is in the immediate vicinity of frequently visited sites and the type of potential clientele already present.

- Marketing

Depends on many factors: media launch, tourism or local partnership, distribution of leaflets, publicity in the media, price to demand ratio, etc.

- The team

The role of the team and above all of the pilots is fundamental to their motivation and their competence.

2. A few examples

AEROPHILE directly manages 8 balloons: Parc André Citroën (Paris), Disneyland® Paris, le Parc du Petit Prince, (Alsace) Walt Disney® World in Orlando (Florida), Pigeon Forge (Tennessee), San Diego Zoo Safari Park and Great Park Irvine (California): each balloon flies from 40 000 to 150 000 passengers per year.

The variations are mainly due to differences in the weather from one year to another, but also to the team and the marketing effort.

V. 3. Type of visitor

Several types of tickets are sold:

Individual tickets, sold at the ticket office and generally comprising 2/3 adults and 1/3 children under 12;

Advance sales, sold on internet or on behalf of works committees, travel agencies, hotels or partners. Generally about 10% of visitors, up to 30% in Paris.

Group and specific events (such cocktail receptions).

V. 4. Overall opinions and perception of the balloon

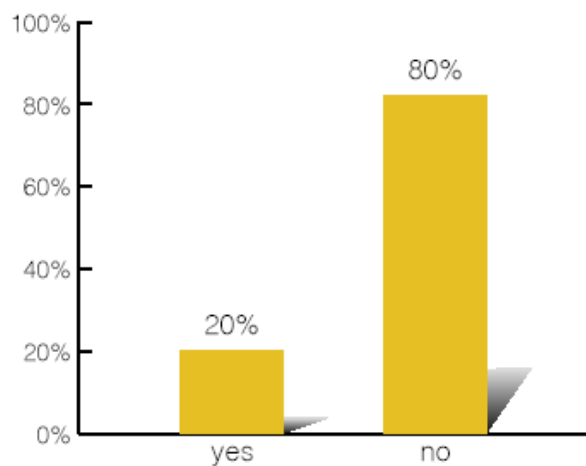
The results of the survey of 300 people carried out by Affimétrie in October 2003.

"I would like you to give me your thoughts for each of the following questions or statements and tell me whether you totally agree, on the whole agree, on the whole disagree, and totally disagree"

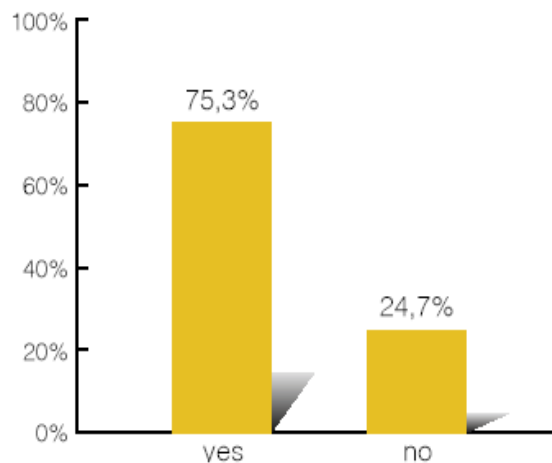
	Agree completely	Somewhat agree	Somewhat disagree	Disagree completely	Don't know
The captive balloon is an original aid to communication	40,3%	46,3%	8,7%	4,7%	0,0%
The captive balloon conveys an advertising message	45,7%	31,7%	17,0%	5,7%	0,0%
The captive balloon is a tourist attraction	53,0%	33,3%	9,3%	4,3%	0,0%
I like the captive balloon	42,7%	44,0%	9,0%	4,0%	0,3%
The captive balloon belongs to the city of Paris	12,0%	14,7%	24,3%	38,7%	10,3%
The captive balloon is an aid of the future	10,7%	46,0%	31,7%	11,7%	0,0%
The captive balloon makes me want to try it	44,3%	30,0%	10,3%	15,3%	0,0%
The captive balloon is attractive and pleasant	48,3%	47,0%	3,3%	1,3%	0,0%
The captive balloon gives me information about Eutelsat	4,3%	15,3%	27,0%	52,7%	0,7%
The Eutelsat brand conveys a positive image thanks to the balloon	13,0%	45,0%	25,3%	15,7%	1,0%
The captive balloon is part of the Paris landscape	30,3%	48,0%	13,7%	7,7%	0,3%
I want the captive balloon to remain in Paris	48,0%	44,3%	4,7%	2,7%	0,3%

Interest in the balloon:

Have you flown in the balloon?

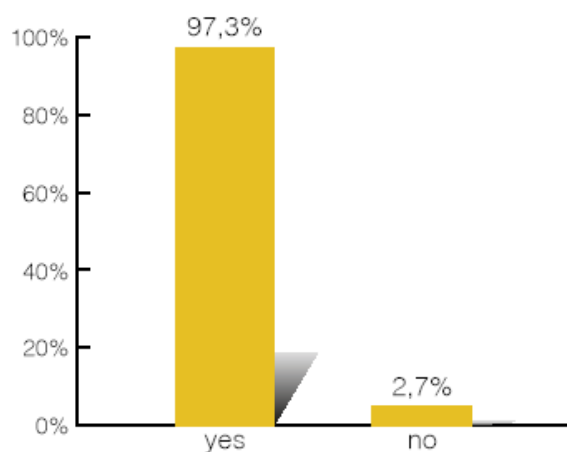


Would you like to fly in the balloon?

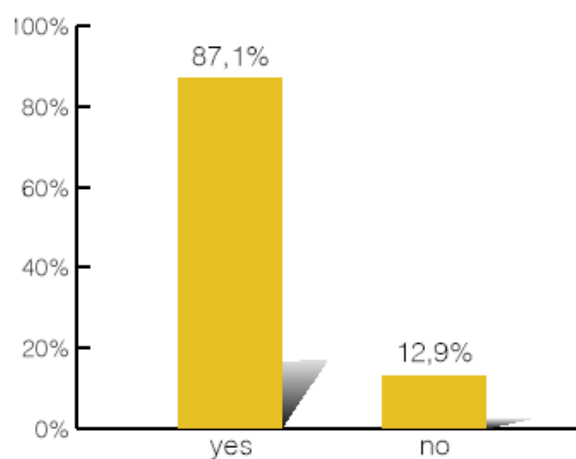


Satisfaction of people flying in the Aero30NG:

Would you recommend a flight to someone else?



Would you like to fly again?



V. 5. Advertising and Partnerships

Advertising is a very important source of revenue, which can provide highly significant amounts of turnover, but potential revenues vary considerably depending on the location.

1. Visibility

- The actual envelope measures 22.80 metres in height, and offers a potential 1,600 square metres for advertising, on the ground in flying position the total height of the balloon measures 34 metres.
- The altitude reached in flight is usually 150 metres above the ground to the gondola, and 184 metres to the top of the envelope, or 300 metres above the ground to the gondola and 334 metres to the top of the balloon.
- The balloon is “alive in the sky” and its movement constantly attracts attention.
- On flat ground, the balloon is visible at a distance of 20 kilometres and legible at a distance of 5 km.

2. Image

A number of strong concepts are associated with balloons:

- friendly, calm and non-aggressive;
- non-polluting and totally silent, perfectly ecological;
- extremely popular, whatever the social category;
- adored by children, with one in three customers aged under twelve.

Located in the heart of Paris in one of the capital’s most attractive parks, in more than 10 years the balloon hasn't received the slightest criticism. On the contrary, they have found a real home in the city and their continued existence has been repeatedly supported.

3. An advertising medium

3 types of markings are possible:

- Mass color of the fabric to have a complete colored balloon or play with the template of the gores.
- Painted decoration: recommended for partnerships of two years or more. With 1600 square metres of fabric and a circumference of over 70 metres, any type of decoration is possible.
- Banners: all sizes up to 10 metres high and 15 metres long, or 4 giant banners per balloon. They can be easily changed (one working day). Smaller banners can be attached to the lower part. The gondola itself can also be decorated all the way around. (See § II.7).

4. The passengers

The passengers experience quite extraordinary sensations. Whatever the site, tourists and local residents alike delight in the aerial view. As the balloon rises to a height of 150 metres the 360° panorama unfolds before them

All types of partnership are possible:

- free tickets
- reductions (discounts) and coupons
- organisation of evening and corporate events
- charity or civic partnerships.

5. Spin-offs

A balloon offers the advertiser numerous spin-off possibilities:

- press: in Paris, this is estimated at several millions Euros. Several thousands articles and ten or so TV and radio reports in the media from around the world.
- media partnerships: offer a free press campaign.
- the name: this exceptional tourist attraction carries the name of the sponsor. The Banque Populaire balloon in Paris.
- commercial documents: leaflets, tickets, etc.

6. Measurement of traffic exposure and results

Extract of report compiled by Affimétrie in October 2003

Calculation of Parisian's exposure to the balloon

"From the results of Affimétrie's extensive enquiries, AEROPHILE was able to study the number of Parisians aware of the balloon, as well as their socio demographic profile. A major observation we made could not be considered using our normal methods. We have estimated the number of people exposed to the balloon whilst driving about the city.

Adjusting for the fact that the balloon is often on the ground (loading and unloading passengers), we have estimated that when flying it spends 66% of its time stationary at the top. (4 flights of 10 minutes per hour).

In consequence we have applied a reduction coefficient of 0.66 on the estimated audience, (individuals and sightings). Using this conservative method, we conclude there are genuinely close to 400 000 Parisians who view the balloon during their daily travels. Based on a repetition average of 1.68, this gives 670,000 individual sightings per day. This means over 5% of Parisians (7 700 000 inhabitants) see the balloon daily. Over a week the proportion rises to around 27.8% of the population. The people surveyed showed less awareness of the actual branding on the balloon, as would be expected. Nevertheless close to 150,000 Parisians or 2% of the total population see the branding daily".

Visibility of the balloon (4 kms)

People	397 103
Contact	666 783

Repetition 1 day	1.68
Coverage 1 day	5.14
GRP 1 day	9

Repetition 7 days	2.17
Coverage 7 days	27.78
GRP 7 days	60

Visibility of the logo (700 metres)

People	147 300
Contact	222 141

Repetition 1 day	1.51
Coverage 1 day	1.91
GRP 1 day	3

Repetition 7 days	1.66
Coverage 7 days	12.13
GRP 7 days	20

V. 6. Other revenue

- Souvenir shop.

In general, nearly every site has a shop near the ticket office, with the size varying widely according to the country and local habits. In France, the average expenditure varies between 0.2 € and € 0.5 € per visitor. The most commonly sold products are postcards and photographic supplies. Elsewhere sales of souvenirs and flight photographs generate highly significant revenues and even match ticket sales.

- Photos:

The photo's activity generates an additional turnover of 20%.

Other possible revenue sources:

- 300 metre flights:

It can be reserved for exceptional events in the morning or evening. Both spectacular and impressive, they truly offer something extra for the high-end clientele and can be sold at a price of up to 40 € per flight. The flight lasts at least 20 minutes. The balloons in Beirut (Lebanon), Beaune (France, 21), Samara (France, 80), Vienna (Austria), Dubai (UAE), Hodeida (Yemen) and Paris (France) have been equipped for the 300 metre option.

- Restaurants, bars:

Balloon activities are highly compatible with bar and restaurant operations. In Paris there is no bar/restaurant but there is a drinks stall and restaurant in Chantilly (turnover: 250 000 €) and a bar in Bordeaux (Turnover: 60 000 €).

V. 7. Business plan

Example of Paris in 2014 and model of US operation

The following information gives the results of Aero30NG operation in the André Citroën Park in Paris (France). This balloon is operated by AEROPHILE. The results are impressive, in particular given that merchandising was relatively limited, a fairly "modest" advertising campaign, strict limits on night flights, access to the balloon site and offering flights to all children living in the City of Paris.

The balloon of Paris is now considered as one of the monument of Paris flying continuously since 1999 with more than 700 000 passengers so far. 50 000 passengers have flown in Paris in 2014.

A US operation model is proposed where keeping expenses and rent of the site are excluded and with an average ticket price of 15 \$, with 100 000 passengers per year and no sponsor.

Income

1. Balloon tickets:

Air de Paris balloon:

- Adult ticket: 12 € (inc. VAT at 10 %)
- Group ticket: 10 € (inc. VAT at 10 %)
- Child ticket: 6 € (inc. VAT at 10 %)

Balloon operations are limited by the park opening hours. Average ticket price of 8 €.

US balloon: Average ticket price of 15 \$ (adult 18 \$ and children 12 \$).

2. Shop and evenings:

Balloon Generali: the Paris souvenir shop is extremely basic. There are four distributors (drink, ice-cream, sweets). Around 20 evenings are organised every year. This income could be increased by other means.

US balloon: small shop and few evening parties in the business model.

3. Sponsorship:

The sponsorship contract with Generali also includes free tickets and evenings.

Expenditure

4. Shop merchandise:

Balloon Generali : mainly postcards and souvenirs.

5. Helium:

About 70 m³ per month.

6. Subcontracting and servicing:

Air de Paris balloon: annual checks, Control Bureau (Bureau Veritas) and French Aviation Authority (Direction Générale de l'Aviation Civile).

7. Supplies:

Office supplies, tickets, etc.

8. Insurance:

Civil liability insurance (17 M€ in Paris, 26 MUS\$ in US) and all risks (complete replacement price).

9. Security:

Balloon Generali : a dog-handler during closed periods.

US balloon: no security in the business model.

10. Overhead expenses:

Lawyer and accountant fees. Manufacture and distribution of leaflets, Web site.

Travel by pilots and hostesses and the management.

Telephone, fax and postal services.

Banking costs.

11. Duties and taxes:

Balloon Generali : local taxes.

12. Wages:

Balloon Generali : 3 pilots, 3 hostesses, 1 ground crew, from 2 to 4 staff per shift on duty during the opening periods which varies between 8 and 12 hours per day depending also on the season and the number of passengers flown everyday:

- up to 200 passengers/day, 2 staff minimum,
- between 200 and 600 passengers/day, 3 staff recommended,
- above 600 passengers, 4 staff recommended.

US balloon: 1 general manager, 1 chief pilot, 6 pilots, 6 cashiers and ground crews. Open from 8 am to midnight, 4 staff per shift.

Management fees, depreciation and any provisions on the equipment are not included and are calculated according to local tax legislation. They may be different depending on the parts of the balloon or the site rental contract and management costs.

V. 8. Balloon Generali (Paris) and US balloon business model

	Balloon Generali (€)	US Balloon (\$)
Income	1 155 000,00	1 630 000,00
Balloon ticket sales	420 000,00	1 600 000,00
Shop & evening parties	25 000,00	30 000,00
Sponsorship	710 000,00	-
Expenditures	455 000,00	610 000,00
Shop merchandise	10 000,00	10 000,00
Helium	5 000,00	5 000,00
Sub-contracting & servicing	15 000,00	25 000,00
Supplies - utilities	40 000,00	20 000,00
Insurance	20 000,00	120 000,00
Security	65 000,00	-
Overhead expenses	50 000,00	30 000,00
Duties & taxes	15 000,00	-
wages	235 000,00	400 000,00
Gross surplus before rental	700 000	1 020 000,00

V. 9. Investments

The following table is an example of an investment plan.

Total investments	in €
Aero30NG EXW	920 000
Transport (two 40' containers) (1)	10 000
Installation crew travel cost, first helium inflation (1)	60 000
Artwork (2)	30 000
Civil engineering(1)	120 000
TOTAL	1 140 000

(1) In case of installation in site without apparent difficulty.

(2) In case of artwork similar to the Disney balloon.

VI. REFERENCES

<i>Date</i>	<i>Event</i>	<i>#</i>	<i>Location</i>	<i>Country</i>	<i>Operated by:</i>
1993	Creation of Aerophile			France	
	Certification in France				
1994	AERO30 prototype	1	Chantilly	France	AEROPHILE
1995	AERO30	2	Cheverny	France	AEROPHILE
1996	Certification in Germany				
	Certification in Australia				
	Certification in China				
	AERO30	3	Bad Fussing	Germany	
	AERO30	4	Surfer Paradise	Australia	
	AERO30	5	Shaoxing	China	
1998	Certification in USA				
	Certification in Japan				
	AERO30	6	Birch Run	Michigan, USA	Virgin
	AERO30	7	Beaune	France	
	AERO30	8	Mount Fuji	Japan	
1999	AERO30	9	Niigata	Japan	
	AERO30	10	Bordeaux	France	
	AERO30	11	Samara	France	
	AERO30	12	Paris	France	AEROPHILE
2000	Certification in Austria				
	AERO30	13	Berlin	Germany	Air Service Berlin
	AERO30	14	Mylau	Germany	
	AERO30	15	Vienna	Austria	
2001	Certification in Italy				
	AERO30	16	Brand	Germany	CargoLifter AG
	AERO30	17	Huis Ten Bosch	Japan	
	AERO30	18	Bologna	Italy	
2002	Certification in Switzerland				
	Certification in Cambodia				
	AERO30	19	Neuchâtel	Switzerland	
	AERO30	20	Angkor Vat	Cambodia	
	AERO30	21	Paris	France	AEROPHILE
2003	Certification in Belgium				
	Certification in Turkey				
	AERO30	22	Brussels	Belgium	
	AERO30	23	Roma	Italy	
	AERO30	24	Istanbul	Turkey	
	AERO30	25	Jeju	South Korea	

2004	Certification in Portugal				
	Certification in Canda				
	Certification in United Kingdom				
	AERO30	26	Paris	France	AEROPHILE
	AERO30	27	Madeira	Portugal	
	AERO30	28	Toronto	Canada	AEROPHILE
	AERO30	29	Bristol	United Kingdom	
	AERO30	30	Branson	Missouri, USA	
	AERO30	31	Beirut	Lebanon	
2005	AERO30	32	Disneyland Paris	France	AEROPHILE
	AERO30	33	Gyeongju	South Korea	
	AERO30	34	Hamburg	Germany	
	AERO30	35	San Diego	California, USA	
2006	Certification in Singapore				
	AERO30	36	Berlin	Germany	Air Service Berlin
	AERO30	37	Singapore	Singapore	
	AERO30	38	Cappadocia	Turkey	
2007	Certification in Dubai				
	AERO30	39	Ocean Park	Hong Kong	
	AERO30	40	Dubai	UAE	
	AERO30	41	Valencia	Spain	AEROPHILE
	AERO30	42	Irvine	California, USA	AEROPHILE
	AERO30	43	Sousse	Tunisia	
2008	Certification in China				
	AERO30	44	Shenzhen OCT East	China	
	AERO30	45	Paris	France	AEROPHILE
2009	Certification in Yemen				
	AERO30	46	Hodeida	Yemen	
	AERO30	47	Walt Disney World Orlando	Florida, USA	AEROPHILE
	AERO30	48	Conner Prairie	Indiana, USA	
	AERO30	49	Las Vegas	Nevada, USA	
2010	Certification in Vietnam				
	AERO30	50	Hon Tam	Vietnam	
	AERO30	51	Disneyland Paris	France	AEROPHILE
	AERO30	52	Istanbul	Turkey	
2011	Certification in Thailand				
	AERO30	53	Angkor Vat	Cambodia	
	AERO30	54	Berlin	Germany	Air Service Berlin
	AERO30	55	Mylau	Germany	

2012	AERO30	56	Nha Trang	Vietnam	
	AERO30	57	Suzhou	China	
	AERO30	58	Gyeongju	South Korea	
	AERO30	59	Happyland, Ho Chi Minh City	Vietnam	
	AERO30	60	Pigeon Forge	Tennessee, USA	AEROPHILE
	AERO30	61	Walt Disney World Orlando	Florida, USA	AEROPHILE
	AERO30	62	Pattaya	Thailand	
2013	Certification in Iraq				
	Certification in Philippines				
	AERO30	63	San Diego Zoo Safari Park	California, USA	AEROPHILE
	AERO30	64	Paris	France	AEROPHILE
2014	AERO30	65	Erbil	Iraq	
	AERO30	66	Vulcania	France	
	AERO30	67	Parc du Petit Prince	France	AEROPHILE
	AERO30	68	Parc du Petit Prince	France	AEROPHILE
	AERO30	69	Cebu	Philippines	
	AERO30	70	Angkor Vat	Cambodia	
2015	AERO30	71	San Diego Zoo Safari Park	California, USA	AEROPHILE

VII. PRICES

COMPLETE AERO30NG SYSTEM

920 000 €

VII. 1. Equipment

- Complete balloon: 580 000 €
 - * 6200 m³ envelope with ballonnet, rip panels, emergency opening and rope passage, minimum lift at ground level 4.8T
 - * Net and mooring system (8 ropes);
 - * Valve, fan (380 V), relief valve, position lights;
 - * Instruments: altimeter, vertical speed indicator, internal and external thermometer, airspeed indicator, dynamometer, pressure gauge, 24 V battery and charger;
 - * Ultra-light circular gondola (30 places), instruments box, protective netting.

- Retrieval system (patented): 260 000 €
 - * Electric motor (45 KVA) ;
 - * Back-up diesel engine;
 - * Emergency descent system;
 - * Radio-control, battery, charger;
 - * Control console: fault signalling panel, redundant controls, etc.;
 - * Hydraulic winch;
 - * Guide pulley;
 - * Conical landing platform;
 - * 150 metres of cable useful.

- Mooring system (patented): 80 000 €
 - * 8 radio-controlled winches;
 - * 8 mooring tables.

VII. 2. Services

- Winch and gondola tested in factory
- Installation assistance:
 - Site analysis.
- Pilot training:
 - * Training on our sites in France (excluding transport and accommodation expenses)
 - * Training on site after inflation (excluding transport and accommodation expenses).
- System installation (excluding transport and accommodation expenses):
 - * Winch installation (5 days);
 - * Advice and assistance with inflation (excluding supply of helium) (3 days);
 - * Start-up (test flights) (5 days).
- 1 year warranty
- Issue of a certificate of airworthiness and a retrieval system safety inspection report from an approved inspection agency.

VII. 3. Conditions

- Payment:
 - * 30% with the order
 - * 30% on construction of the large items by letter of credit
 - * 40% on delivery by letter of credit

Offer valid until March 31th, 2015.

Price ex. works excluding VAT (Incoterm EXW). Price valid worldwide.

VII. 4. Options

- Emergency parts	40 000 €
- 300 metre option	50 000 €
- 400 sand bags	6 000 €
- Internal Illumination including in-board generator	30 000 €
- Projection (Air quality light)	50 000 €
- Flight Performance Monitor: computerized system of data recording to monitor and optimize the performance of flight	20 000 €
- Artwork	quotation on presentation of a mock-up



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