Foreword

• AAAT is a company founded for holding and bringing to reality an ambitious project: launching the first dirigible, heavy carrier.

AAT is originally holding its legitimacy by the support of Marc Senepart, through his long-stand aeronautic experience and patents filed on his name (see in annex reference to patents).
Marc Senepart is engineer and has been graduated from Aeronautic School of Ville d’Avray and has been instructor at « Ecole de l’Air de Rochefort ».

AAT is otherwise led by Jean Lescat, entrepreneurship leader and having a huge experience in exporting value added raw material to Russia and China.
Various market studies, among them one from Ecole de Lausanne describe the different logistic needs, potentially solved by the Heavy Carrier Dirigibles. We refer to our own approach and calculation in a separate AAT document: «a market approach for the Heavy Carrier», done by logistic specialists.

The advantages of the dirigibles are well known, provided we have solved one of the main tasks of such a carrier: to vertically autonomously move and so doing to land on without heavy specific infrastructure. AAT is proposing such a way.

Among various markets we select:
- large industrial loads and equipments
- heavy and voluminous value added materials
- humanitarian large and bulky supplies
- civil servant and military applications

Project presentation
The last significant European project, Cargolifter has marked for a certain time the future of Dirigible in Europe and beyond it, over the world. Indeed the bankruptcy of the dedicated company asks ourselves for the reasons of such a collapse, although this project had behind it both the experience of the world most developed dirigible industry in Germany early the 20th century and the finance and support of all main German companies.

Some topics prevail to answer such big question:
- the technical design was not completed when the project was industrially launched,
- the size of the project was directly chosen to a supposed optimised size, instead of going through steps, in learning continuously how to adapt technics and costs to market,
- market approach was not enough and specifically defined.
Taking into account the here above comments, the project is based on the following programme steps:

- the first step consists in engaging the necessary studies to firmly choose the right way. A 2 year programme involves all necessary theoretical and practical studies for constructing the first prototype. This first step takes into account the definition of this first operational prototype, according to needs.
- the second step is to build the prototype and to check its navigability and viability and to get certification.
- as soon as the prototype has proven its ability to fly in accordance with objectives, the 3d step starts that consists in launching the programme for constructing the large heavy carrier.
The first step, corresponding to « studies » is conducted as follows:

- **AAT has suggested to conduct this project with ONERA**, according to a specific agreement.
- AAT has otherwise already started various feasibility studies with **UPPA** (University de Pau et des Pays de l’Adour). The needed detailed studies for the prototype have to be developed according to an agreement
- (agreements with Mme François, vice-président and M. Amara, professor) for the considered project.

UPPA has otherwise taken the lead of a group of French Universities, Montpellier, Ecole des Mines de Nantes, Sophia-Antipolis. Some other European ones are also followed by UPPA: Ruprecht Karls of Heidelberg, Liège, Pais Vasco, Czestochowa, and the ones from Tchéquie and Romania.
The first step is supposed to be financed as follows:

- 6th PCRD subsidies - 2nd and 3d call
- Industry and Transport French Ministries support
- Industrials support as belonging to the Study Consortium

The second step is to be prepared during the time the studies are conducted. It is to be built with the Industrials being part of the Consortium as well with other Industrials and potential dirigible operators, interested to join the Consortium.
Project programme, Collaboration

AAT has signed already Collaboration agreement with:

- CEMA, Aeronautic engineering, in particular for A380
- Air Liquide
- GDTech – from Aeronautic Belgium Group, EWA
- Club Tex
- Astrium transport

Various other companies are ready to support the project:

Renault, EADS lanceurs, La Poste, Capelle, Pierre Ponomareff’s,
Vosper Thornycroft
Project programme, Collaboration

AAT has also signed Collaboration agreement with foreign companies:

- Thermoplane Oulianosk – Russia
- Shanghai Vantage Airship Manufacturer Co Ltd
The heavy carrier, First

This project is not the prototype project. It is to be done at the 3rd step.

Length: 300 m
Diameter: 73 m
Helium volume: > 660,000 m³
Total Weight: > 650 tons
Propulsion: 6 engines of 36,000 Hp
Vertical control and unloading by compression
Gondole: 60 m x 12 m x 8 m volume about: 5760 m³
The heavy carrier, the studies

All questions related to here-above influences are studied with UPPA in Pau.
A first thermodynamic analysis of the constraints on Helium and the thermic exchanges has shown that a rigid global structure and a multi-part enveloppe should be chosen. The maximum available volume targetted for Helium so that satisfied to the requirements of flying characteristics, the flying ceiling and payload, is 900,000 m³. This volume is chosen for determining the global frame of the dirigible.
The heavy carrier, the principles

The enveloppe volume has a capacity of more than 900 000 m³

The lower part is to receive the upper platform of the gondole structure
The heavy carrier, the principles

The arrangement of the fins allows, when flying, a dynamic and constant control of rolling and movement of nosing up or diving.
The heavy carrier, the principles

Enveloppe conception and Global shape

The enveloppe is shared into several cuttings, every 10 m along the generating curve. Each cutting specifies a diameter related to the above curve. The cutting of the enveloppe foil is chosen so that the strenghht on the fabrics is acceptable.
The heavy carrier, the principles

aerodynamic study
The heavy carrier, the principles

3 fins at 120 degrees
The heavy carrier, the principles

Karman

Fan vent

The rear bulb is complex as it holds the linking karmanas of the fins and the directional fan.
The heavy carrier, the principles

both rear bulb and fins
The heavy carrier, the principles

the upper platform of the engine room beam
The heavy carrier, the principles

Longitudinal Engine room beam

All lift strenghts of the different internal Helium volumes are taken by this structure that contains piloting area, team cabins, technical facilities, power supplies compartment as well with all heat exchangers, turbine air and control inlets, and gas exhausts.
The heavy carrier, the principles

Overview
The heavy carrier, the principles

Heating System to avoid freezing problem

- Heated air injection
- Control at foil top to maintain preconstraint pressure
- Heat exchange of exhaust gas
The heavy carrier, the principles

Air Ballast System
The heavy carrier, the principles

Landing on operation

The gondola, once deconnected let the carrier doing another mission, as crane or on cargo sling
The heavy carrier, the base

A possible base in South-West of France
The heavy carrier, annex

**Patents:**
