

The development of an airship sector Technology or Economy?

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Introduction

I am an official at the Italian Ministry for economic development/Department for Development Policies where I am head of the Communication unit. My education is in economics and law and I worked for many years on research policies.

But I'm here not as a civil servant but for my "airship side". I'm the president of "Associazione Dirigibili Archimede" a non profit association established in Rome at the end of 2002 with the aim of diffusing knowledge and promoting the use of airships. The country target of our action is Italy, one of the five or six countries that have written the history of the airship but that today is practically out of the game (with the recent interesting exception of the italian capitals invested in SkyCat Group Limited).

Our activities are mainly in the field of communication/diffusion of knowledge. I listed here some of them:

- first of all the website, at the moment the main italian site devoted to the airships.
- the so called "airhip information counter", where we answer to specific questions through our mailbox (or telephone)
- participating in conferences and workshops,
- collecting documents and diffusing them on the web
- supporting people wanting to do "airships-related activities" (students, companies, public authorities, ...)
- realizing small useful experiences with an RC airship
- ...
- ... and many more programs in the pot.

In my presentation, I'll go through the airship subject from an economic perspective. In short, I'll start from the question about the always belated return of airships. After a brief sight to performances and technologies, I'll approach the economic aspect of this business beginning from the markets and dwelling on some economic obstacles, concluding with a few strategic issues and possible actions, in particular the starting conditions.

For brevity's sake I'll proceed through some flat statements that would need deeper explanations.

1. To begin, a question mark about the always belated return of the airships.

The present situation of the sector sees many ultra large/high tech projects aborted or stopped:

- Cargolifter
 - SkyCat 1 (ATG)
 - DARPA/Walrus
 - US-MDA/HAA
 - Japanese HAA
 - Korean HAA
- (DARPA-ISIS goes on)

and some small (in size and numbers) ongoing activities ... something also is rising in the Far East

- Zeppelin
- American Blimp Corporation
- Skycruiser Group
- Rosaerosystems
- Voliris
- Huajiao Airships
- ...

Between the two situations a gap in the middle, ... perhaps too wide a jump.

Being it superfluous in this room to indulge in describing the many potentialities of airships, I shall confine myself to remembering the performances realized by airships many decades ago through some evocative names like "L59", "Norge", "Graf Zeppelin", "Snowbird".



The "Snowbird", eleven days/more than 15.000 km of continuous flight without refuelling in 1957.

Performances of yesterday interesting also today.

From then over fifty years of intense scientific and technological advancements.

I will recall here something about the technologies, not a list (that would be very long) but a classification of today available technologies “seen from the airship”

- External technologies: scientific and technological advancement external to airships but able to enhance their conditions of use. As an example see the progresses in meteorology (both the understanding of the phenomena and the availability of real time data) ... fundamental for airships
- “Off the shelf” technologies: devices that can be used without modifying the airship structure (e.g. GPS)

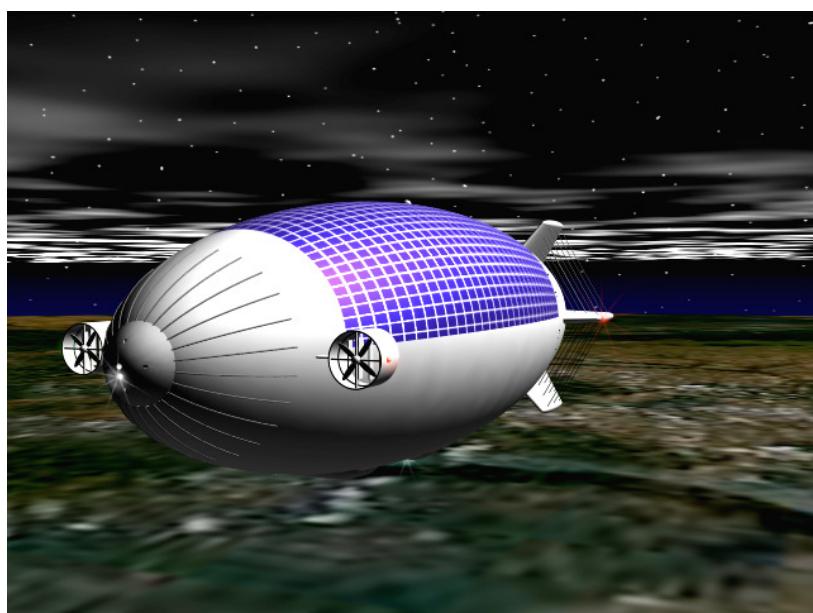
The contribution of these first classes of technologies would have greatly improved the performances of the airships of the past, as they were, without any modification in their structure and characteristics. In particular, the two quoted examples, if available in 1928 (both or only one) would have prevented the “Italia’s” crash on the pack.

To follow, the

- “Embedded technologies”: those requiring/allowing more or less important modifications in the airship (engines, envelope and structural materials, avionics, automation, ...)
- payload technologies (e.g. sensors) that expand the possible applications
- new designing and production processes becoming more economic, faster and reliable

Without forgetting the future technologies at the door and their promises.

- Robotics & Automation
- New materials
- Hydrogen technologies
- Micro and Nano-technologies
- Photovoltaics (e.g. polymers)
-
- up to the unmanned scenarios



Here we can see a possible stratospheric airship (*Aeros Corp.*)

So probably the technology is not the bottleneck and we should search for it elsewhere.

Let's look into the field of economics.

2. A second question: can the airship be the base of a profitable business?

About this point I recall that we have presently examples of small airships working with success in some niche markets. We do not have current examples of medium/large airships in service, so here there are no evidences ... but many clues.

Below we can see a number of important markets where airships could be valued for their peculiar characteristics.

- Advertising
- Aerial observation (many types)
- Patrolling & monitoring
- Scientific research
- Short range tourism
-
- Long range tourism
- Transport of oversized loads
-
- Telecommunications and Earth observation (stratospheric)
-

In the list, in black are some of the missions that existing airships can perform and actually performs (and that could justify a larger demand); the markets in green refere to airships not currently in production although certainly in the range of existing technology. In red are markets and missions in need of further research and development.

Potential important markets ... but also some global trends that could ask for airships distinctive capabilities.

- Environmental concerns
- Energy constraints
- Intense demand for telecommunications
- Growing role of logistics
- Need for security/surveillance
- Trends in tourism
-

And I would also add to the list, the effect of the growing number of the large cities (over 300 in the world with more than 1 million people – including the mega cities of tens of millions).

3. But some important economic obstacles

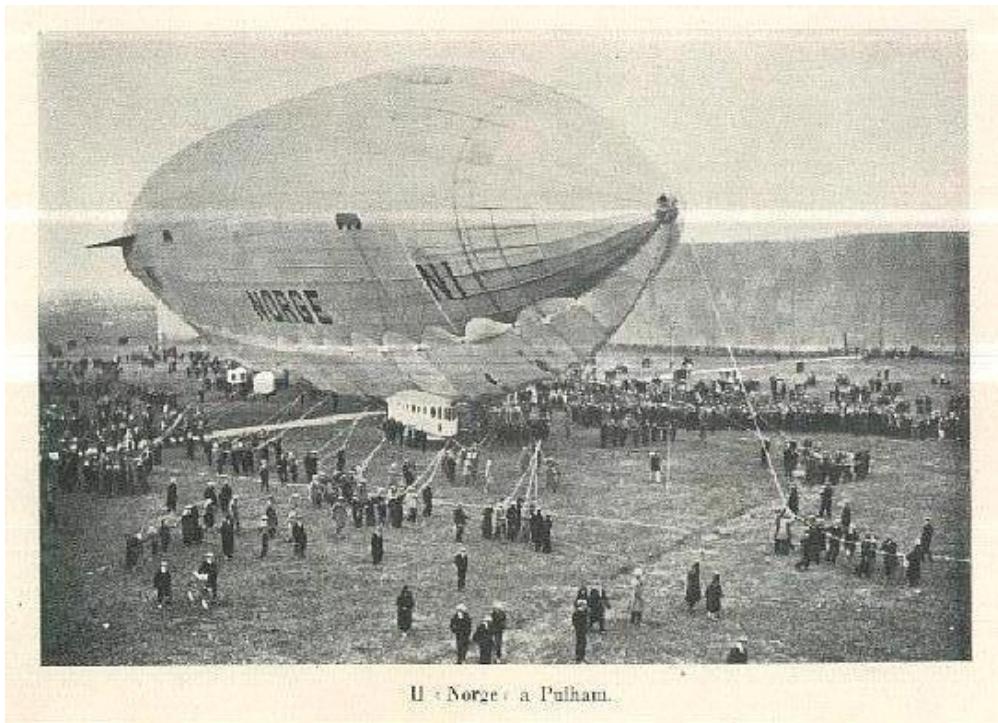
Therefore, interesting present and prospective technologies and markets on one side but also, on the other side, some important economic obstacles to the expansion of the airship sector.

I will enlist some here:

- Personnel
- Infrastructure

- First step handicaps
 - systemic handicaps
 - learning curve
 - Development costs

3.1 First the personnel: an historical handicap. Historical in two senses, it was so, it should no longer be so.



U - Norge a Pulham.

The airship technology was a labour intensive one, with many people on board and on ground.

Let's look at a list of navigating personnel for an airship of 35.000 cm (medium-small) from a study of Umberto Nobile in 1922.

- Commander
- Second Commander
- 2 steersmen
- 4 motorists
- 1 radio operator
- 1 laborer
- 1 rigger
- 1 mechanic
- Total 12
- + More than 150 ground handling personnel

Here we see figures not compatibles with any commercial activity.

Numbers of the past. At a first sight we perceive the signs of an obsolete technology. On this point we have to consider that one of the main technological drivers in the last half century was the

revolutionary (sometimes problematic) impact of the labour saving techniques on industrial economies. Everywhere we see astonishing reductions in people employed in the production processes. Furthermore there are the indirect labour saving effects of the general progresses, such as more reliable and simpler systems and devices. Referring to the above list: better engines/less motorists, easier radio devices/less or no radio operators, ...

In passing on I'll focus on the critical importance of the reduction in flight crew that transforms paid load in paying load.

3.2 A second point is the infrastructure. I wish to highlight here two aspects, the mean cost and the unit cost of an airship infrastructural system.

Considering the various types of infrastructures that airships can use, from the “A class” (very costly) bases with hangar and all the necessary plants, to the simpler bases with a mooring mast and little more equipments, up to temporary bases with minimal preparations, we can expect that the mean cost of the airship infrastructure is not too high.

More problematic is the subject of the unit cost, connected to the utilization rate. If we look at the number of airplanes “processed” in an airport, we understand that it will not be easy for the airship business to emulate those numbers. So, a cheap infrastructure insufficiently used could become an expensive one.

Many the possible solutions to this problem (all needing experimentation), such as:

- balancing the net through a proper mix of various level infrastructures
- pursuing higher utilization rates
- running the infrastructure not just as a cost center but as a profit center exploring compatible activities
- and obviously ... adding more technology to obtain lower costs and faster operations.

3.3 Moving to a third class of obstacles, we find the “first step handicaps”. They are on one side “systemic”, i.e. related to the general context, on the other side they refer to the “learning curve” and are specific of each manufacturer and operator.

For the first group (systemic handicaps), if I want to start a business with aeroplanes or trucks I find ready-made:

- infrastructure net
- Trained personnel
- Maintenance centers
- Regulatory framework
- Schools
- Information (both general and specialized)
- Learned markets (they know how to use the means and their services)

The majority of these conditions is absent in the case of airships, those necessary items having yet to be developed, and this require time and money.

A second group of “first step handicaps”: the learning curve handicaps, refer to the industry itself and consists essentially in the lack of know-how in all its dimensions (industrial, operational, managerial, market know how, ...)

The First Step Handicaps entail in general more costs and less revenues: a very heavy burden. Yet, if we want to see a positive aspect, they form a kind of “competitiveness reservoir” (having a decreasing impact over time).

3.4 Coming to the last obstacle here considered, some words about the development costs.

Let's remember, to begin, the development costs of some big projects

- a recent Congressional Budget Office study about an heavy lift “Walrus type” airship, estimated costs from 3 to 4 Bn \$
- Cargolifter: 400 M€ (before completion)
- a Shell study, realized in the seventies, for a gas transportation airship: 2.5-3.0 Bn £ (in £ 2002)
- not to forget the important sums recently estimated in the “Use-HAAS” study for the development of stratospheric platforms (over 15 years)

Perhaps these costs are not too high in absolute but they represent a very challenging commitment in a situation lacking in

- an established industry
- operational experience
- proved services
- visible examples
- an enabling context

and in the presence of

- high levels of technical and commercial uncertainty
- long (or very long) times to market

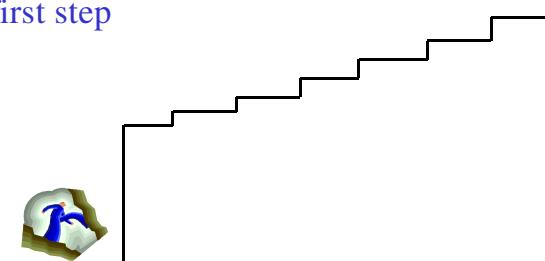
Furthermore, let's not forget, if we look at airships as a system, that also the services have their own development costs and times

Resuming the obstacles:

- Personnel: an historical handicap
- Infrastructure: a present concern
- First step handicaps: disabling but temporary
- Development cost: a strategic choice

From the above said, one general feeling about the airship business:

The airship business: perhaps
good at regime but too high the € (?)
first step



with a concentration of difficulties and uncertainties in the first phase

And as a consequence:

- the lacking of investors (public and private)
- a weak demand

Under many aspects, an egg & chicken scenario, as we often find in the field of economics of development (I don't build the road because there is no traffic. There is no traffic because I don't build the road).

And this calls for some strategy to break the circle

4. From economy to strategy

Now I'll pose here to your attention some strategic issues, primarily referred to the creation of favourable starting context or preliminary conditions

Starting from strategic (interconnected) needs

- to lower the first step
- to attract investors
- to activate demand and build the market
- to mobilize the public sector (not simply as an investor)

Through some possible actions

- Communication and education: There is a very low level of general information on airships and on airship business, that explains part of the difficulties. In our promoting activity, when we talk about airships (also to educated people and decision makers) we have to clear up firstly that we are not joking, then that we are not in the field of industrial archaeology, after that we can talk about the subject, so there is much need for basic communication.
- By offering detailed and reliable information: this information is not at hand now. Investors, potential customers, politicians, administrators, if interested in the subject and wanting to know something more, have not an easy task (and often what is not easy is not done, especially in the first stage).
- Then the interest must be fed through available solutions not too far in time. I recall the importance of doing experimentations (e.g. pilot projects) with existing airships. Those experimentations are both a mean to acquire knowledge (technical, operational, of business) and a powerful communication tool (I believe because I see)
- More, and this is an unsteady terrain: to offer potential investors in development of airships more manageable bets (not too high cost-time-uncertainties), e.g. exploring mid size/state of the art segment
- ... and promoting and diffusing studies and researches (technical, economic, of business)

Among the introductory actions I would include some effective low-cost initiatives (guerilla tactics) useful in building, mainly in the initial stages or in situations of limited resources, some components of the system such as:

- Model airships
- Virtual airships
- Ultra Light Airships
- Information (e.g. "airships on the net")
- Studies and Analysis

In the end I would remind the important role that the public sector can play in the development of the airships, through a number of actions, (not always/necessarily involving heavy financial engagements).

Firstly, building a proper regulatory framework

Secondly, through public demand. Supporting the sector, in an indirect and not costly way, acquiring airships and/or their services (a not costly way if in front of the demand for means and services there is an effective response to real public needs)

Then there are the traditional incentive systems. Various and abundant (and not always finding in front of them sound projects).

And last but not least, not to forget, the role that public sector can play in solving (often without much expenses) the facility problem.

However, on this point I would state that though important could be the public support we shouldn't forget that the true viability test for the airship industry will remain that of the market.

Conclusive remarks

Reasoning about the rebirth of airships, many clues tell us that the state-of-art technology (not just "airship technology") is probably sufficient to justify a much more important presence of the airships than we see today. In this sense, **technology is not the bottleneck**.

In the field of economy, aside very interesting potential and prospective markets for the airships, there are some important economic drawbacks and egg-chicken situations, many of them related to "**first step handicaps**" and to the cost and difficulties of **starting a new system** (not just building a new type of aircraft).

In this perspective, **lowering the first step, creating a favourable context both material and immaterial, offering solutions not too far in time** is of critical importance in order to attract the investors and stimulate the demand.

Among the most relevant actions to reduce cost/time/uncertainties of the initial stage I recall

- communication, both general and specialized
- experimentations of airships, services, appropriate business models;
- exploration of the potentialities of the mid size segment

All this given, airships promise to have a relevant future, becoming, once crossed the first step, a valuable integration to existing platforms and a sound response to important present and emerging needs.