

Regional suborbital services - prospects for Central Europe

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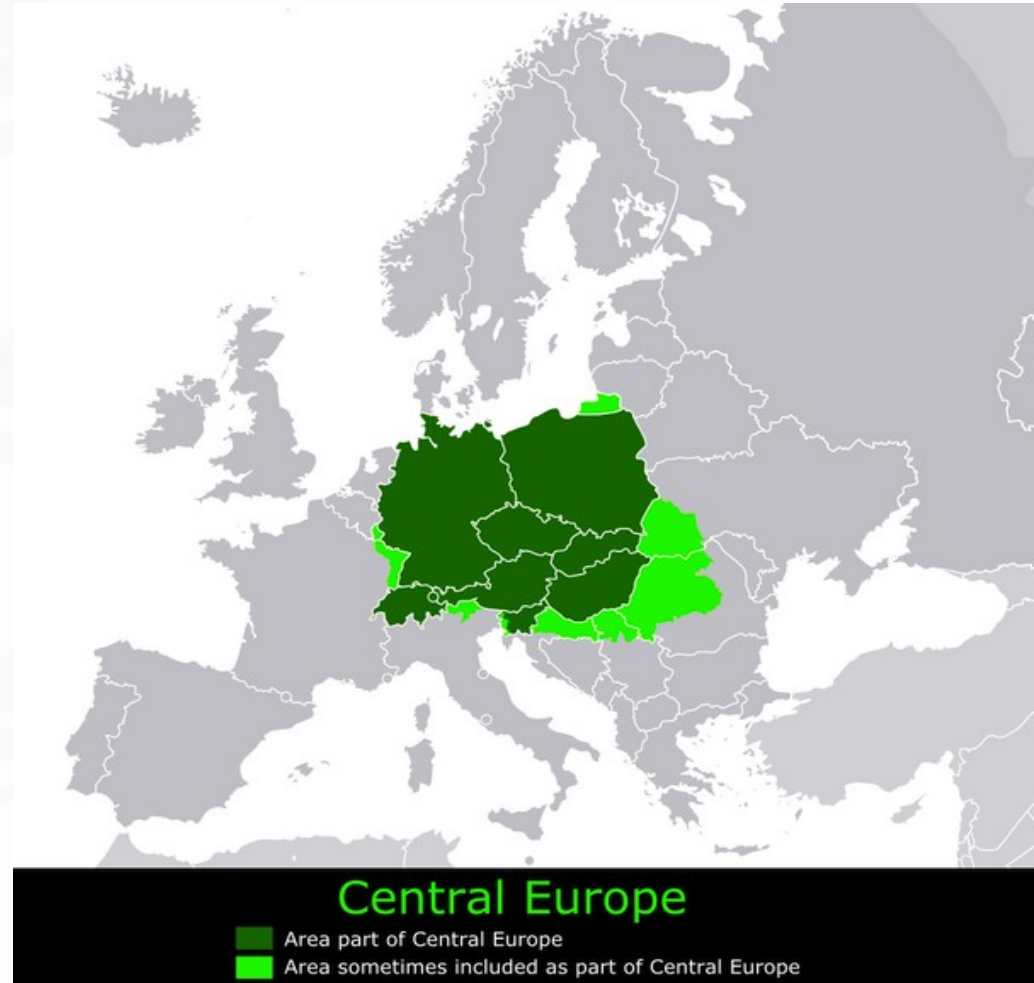
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Presentation plan

- Introduction – scope of this presentation
(description of the region and current status)
- Comparison of different μg platforms
- Suborbital flights – business model
- Payloads and suitable launch airports
- Space tourism aspect
- Conclusions

Introduction - What is Central Europe?

- Historically, divided into 'East' and 'West',
- During last two decades experienced significant changes,
- The above division is no longer accurate,
- Several countries from this region (PL, CZ, SK, HU, RO, SLO) share some similarities,
- One of such: developing space sector.



Introduction

PL, CZ, SK, HU, RO and SLO:

- "New members" of the European Union (EU),
- 85 million people, significant economic growth in recent two decades,
- Budgets for R&D relatively low (0.6-1.5% of GDP – ca. 6 billion USD in total), but due to the EU goals values will be increased in the coming years,
- This might result in more research and innovation, but still funds will be limited.

What about the space sector?

PL, CZ, SK, HU, RO and SLO in space

In the last few years the integration process with the European Space Agency (ESA) has initiated:

CZ and **RO**: 2008 and 2011

PL: 2013 (?)

HU: PECS stage, **SK** and **SLO** – integration process

With accession to ESA these countries will increase spending on space

Yet funds will be limited and creative methods to reduce costs might be the key to success

One example solution – use of available microgravity (μg) platforms for tests, demonstrations and experiments
(this is an example niche)

PL, CZ, SK, HU, RO and SLO in space

- Only in PL, CZ and HU we have identified more than 20 various projects, institutes and companies, which may benefit from μg experiments.
- Potential payloads (from the above survey):
manipulators, robotic sample-collectors, μg stabilization, material sciences, electronics + hardware tests and student payloads.
- Neighbouring countries, such as Germany, Austria, Sweden or Baltic countries were not (yet) surveyed.

This is an encouraging market potential.

Microgravity platforms

Stratospheric balloons:

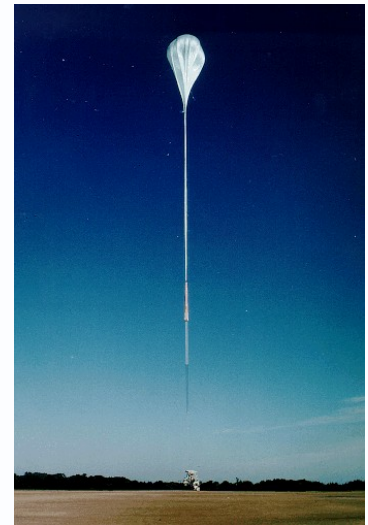
- Advantages - low cost, little infrastructure required, high safety, no acceleration,
- Disadvantages - short μg time, low altitude of flight, limited flight control, limited space/weight, longer access to samples after flight, risk of payload loss,

Drop towers:

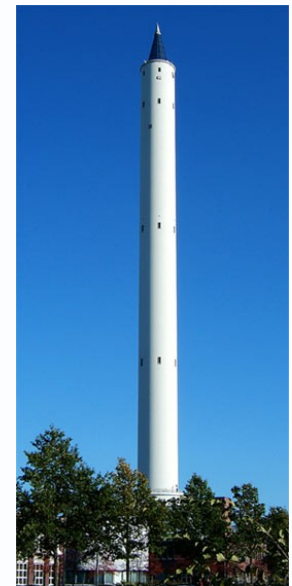
- Advantages - fast access to samples, high μg quality,
- Disadvantages - few drop towers around the world, high cost, limited μg time,

Parabolic Flights:

- Advantages - several flight profiles available, longer total μg time, short-sleeve environment,
- Disadvantages - limited commercial access, lower μg quality, short individual μg time.



(CSBF)



(Wikipedia)

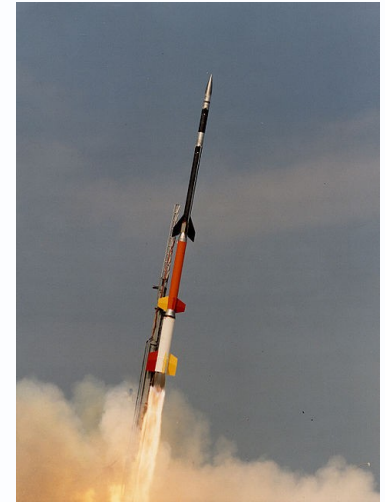
Microgravity platforms

Sounding rockets:

- Advantages - long μg time, high quality μg , high altitude of flight,
- Disadvantages - high acceleration, high cost, limited space onboard.

Commercial suborbital services:

- Advantages - fast turn-around, several payload options available, low acceleration, flexible available space, high quality μg , in some cases use of existing infrastructure (airports), possibly low cost per kg of payload,
- Disadvantages - no market entry (yet), flight regulations (supersonic flight).



(NASA)



(Rocketplane Global)

Commercial suborbital services offer several important advantages over other systems.

Commercial suborbital services

Who and on what conditions would be a client of such commercial suborbital services?

Key factors:

Cost

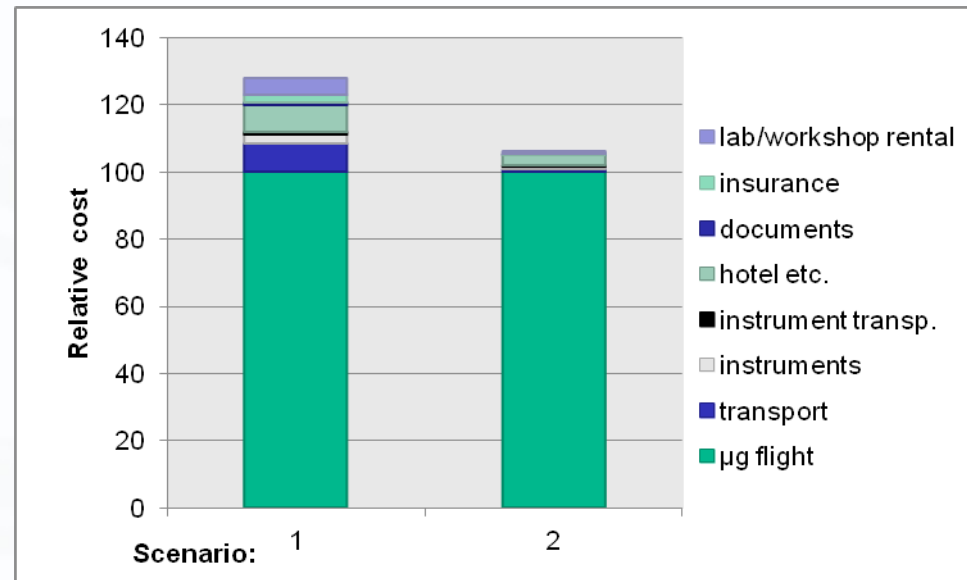
(flight + transport + labs + etc.)

Time

(total time, return of samples)

Complexity

(bureaucracy, insurance, etc.)



1 – flight from USA,
 2 – flight from Central Europe
 (case – company from Central Europe)

Significant reduction of cost if flights origin from this region

Commercial suborbital services

An outlook for 2011-2020:

- All countries from Central Europe will be members of ESA well before the end of decade,
- Space-related funds will be increased (how much? It is too early to estimate, at least tens of millions USD),
- Cost will be a driving factor, so regional services might be the solution,
- The demand will for sure be not enough to support constant services – rather a „road-show” model from time to time (e.g. several flights every two years).

„Road-show” model

Local company organises the „road-show”:

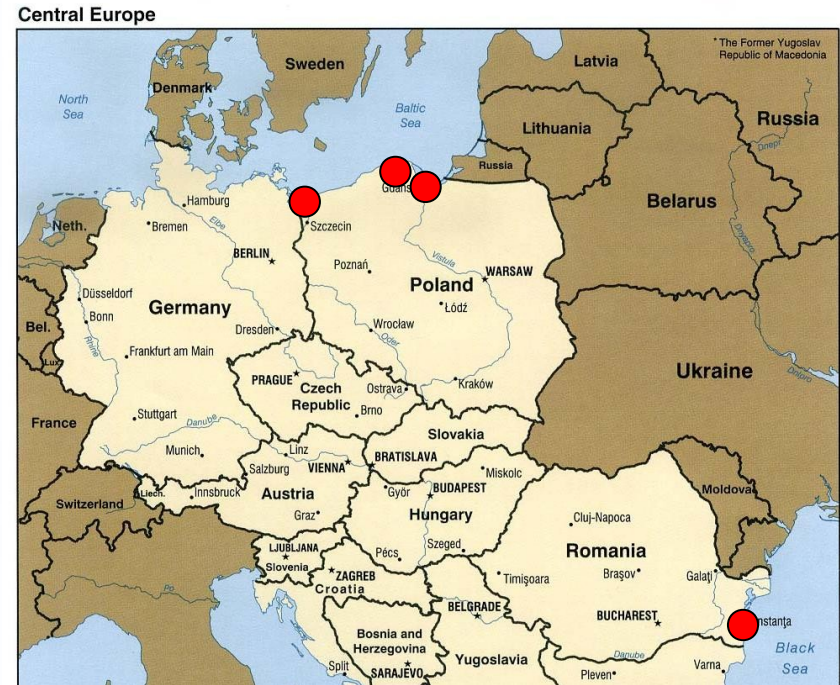
1. Issues call for projects, passengers, experiments etc. is announced with stated preliminary date,
2. Clients (private, government, commercial) answer to the call, negotiate terms, sign contract and pay the deposit,
3. Once the minimal number of flights is reached, the suborbital service provider confirms the „road show”,
4. The exact date of the „road show” is finalised and the „launch campaign” begins.

Finally, the suborbital service company sends its craft to the selected airport just before the „road show”...

„Road-show” - from where?

Across Central Europe there are several airports from where suborbital services can be done. Due to legal, local and technical limitations these four might be the most convenient.

(Commercial airports next to the sea, 2500+ m runway, limited number of passengers, existing infrastructure, lab/workshop space available, connections with the rest of Europe)



Space tourism aspect

- Interesting aspect of the „road-show”,
- Local media, TV stations etc can buy several tickets and organise an ad/promotional/entertainment campaign,
- With the space tourism the number of flights from local airport might increase,
- Space suborbital tourism might result in higher chances of „road-show” – type flights from the Central Europe
- Space tourism is a complex topic, requires more detailed analysis and is dependent on several factors, which are more difficult to estimate than payload flights.

Rocketplane Global and Kosmonauta.net

- Rocketplane Global and Kosmonauta.net officially signed a LOI (Letter of Intent) related to suborbital services in the „road show” fashion.
- Kosmonauta.net will investigate technical, legal and organisational feasibility of such services from selected airports.
- If successful - first possible flights in the 2015 time-frame.



(Rocketplane Global)

Conclusions

- At least one „road-show” type campaign is possible, if not probable to be conducted from selected Central European airport.
- Suborbital flights originating from Central Europe offer cost, time and complexity reductions for local companies and governments.
- Coordination done by a local company, which is aware of region’s characteristics and limitations.
- Payload + space tourism campaign = more probable „road show” from the Central Europe.

Questions?

Thank you for your attention!

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