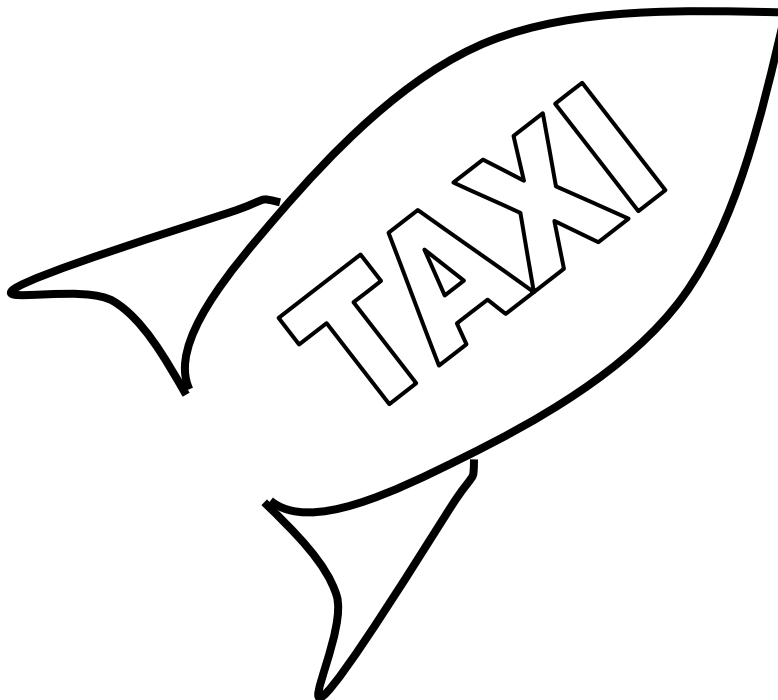


## MDS – Smart transport system

*Delivery payload to Earth orbit*



*Easy as call taxi.*

*Information bulletin 3a  
Martin Jediný  
05 / 2012*

# MDS – Smart transport system

*Easy as call taxi.*

*Delivery payload to Earth orbit*

<u>WITH TAXI VISION</u>	<u>WITH TODAY BUS</u>
unbeatable price for start	need waiting for available start
lift off when I want	waiting months or years for common start
lift off where I want	available only common orbit determined by direction of flight
lift off as often as I want	need waiting where and when will be next start
customer set the rules for payload	very restrictive rules
only small values at risk	danger for main cargo and valuable spaceport facilities
very easy certification	expensive and difficult certification

*Purpose of this project is to open up new opportunities. The common flight/BUS is just cheap. The taxi **has** other **advantages**. With extensive certification process for BUS, taxi has the potential to be cheaper or taxi may be the only choice in some causes...*

<u>Opportunities</u>	<u>Uncertainties</u>
<p><b>Acceptable level of risk</b>                      We work with small value                      Reliability exponentially increases the value of service and customers do not require it                      Great benefit for low cost satellites</p>	<p>Decreasing reliability causes negative impact on usability                      Useless if the transport costs are only 10% of total price of the project</p>
<p><b>Low bureaucracy</b>                      Very easy and simple solution                      Low fixed costs</p>	<p>Only when customer accepts the risk level                      Ensuring repeatable quality                      Safety</p>
<p><b>Easy rules for satellites</b>                      Easy rules – wide range of possibilities                      Customers specifies the level of risk and guarantees as it is needed</p>	<p>Risks for service personnel</p>
<p><b>Easy access to LEO</b>  <b>New market segment</b>                      - costs for launch                      - readiness                      - easy rules</p>	<p>New market segment</p>
<p><b>Streamlining of solution</b>                      - existing technology                      - known processes                      - intelligent software                      - great potential of EU knowledges                      - flexibility of small businesses                      - new approach to challenging projects</p>	<p>- possible missing parts in the chain of solution                      - investment risks                      - untested approach to challenging projects</p>
<p><b>Added value</b>                      - capitalization of the investments into knowledges                      - enlargement of technological competitiveness                      - efficient use of EU contribution to achieve results</p>	<p>- costs for meet the requirements of EU committee</p>

## Draft of MDS solution

*The service is designed as a whole. But its parts are usable alone or in combination. Small and modular system.*

### 6. Communication center

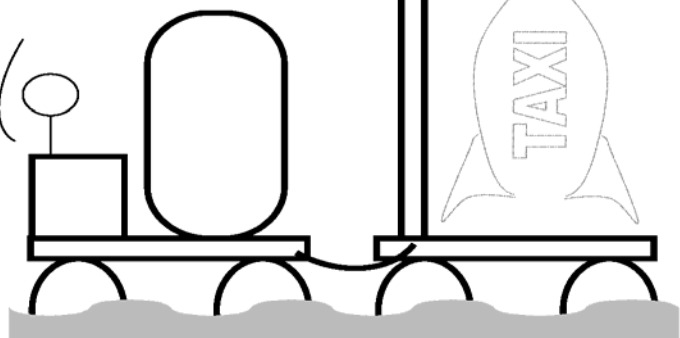
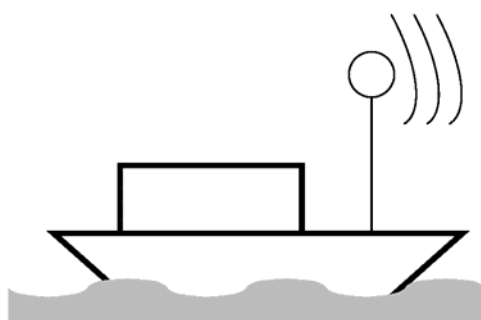
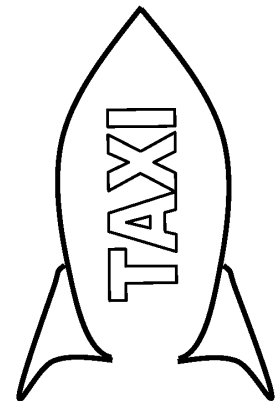
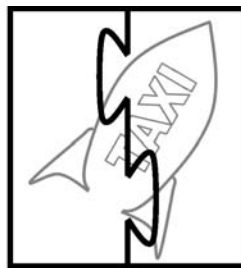
*Management and two-way data transfer Earth - LEO*

### 1. Management

*Clever management  
Easy cooperation  
Save knowledge  
Access to knowledge*

### 2. Rocket

*Easy concept, standard manufacturing processes.  
The medium level of reliability.  
Safe without fuel.*



### 5. Mobile command center

*Automatic preparations of the launch.  
Safety of personnel by safe distance*

### 4. Service platform

*Always full safety level,  
Modular variability.  
Fully automatic start.*

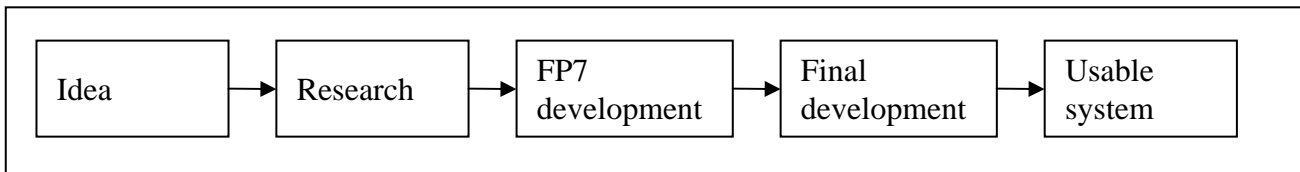
### 3. Launch platform

*Platform itself is safe, level of safety depends on rocket on board,  
modular variability*

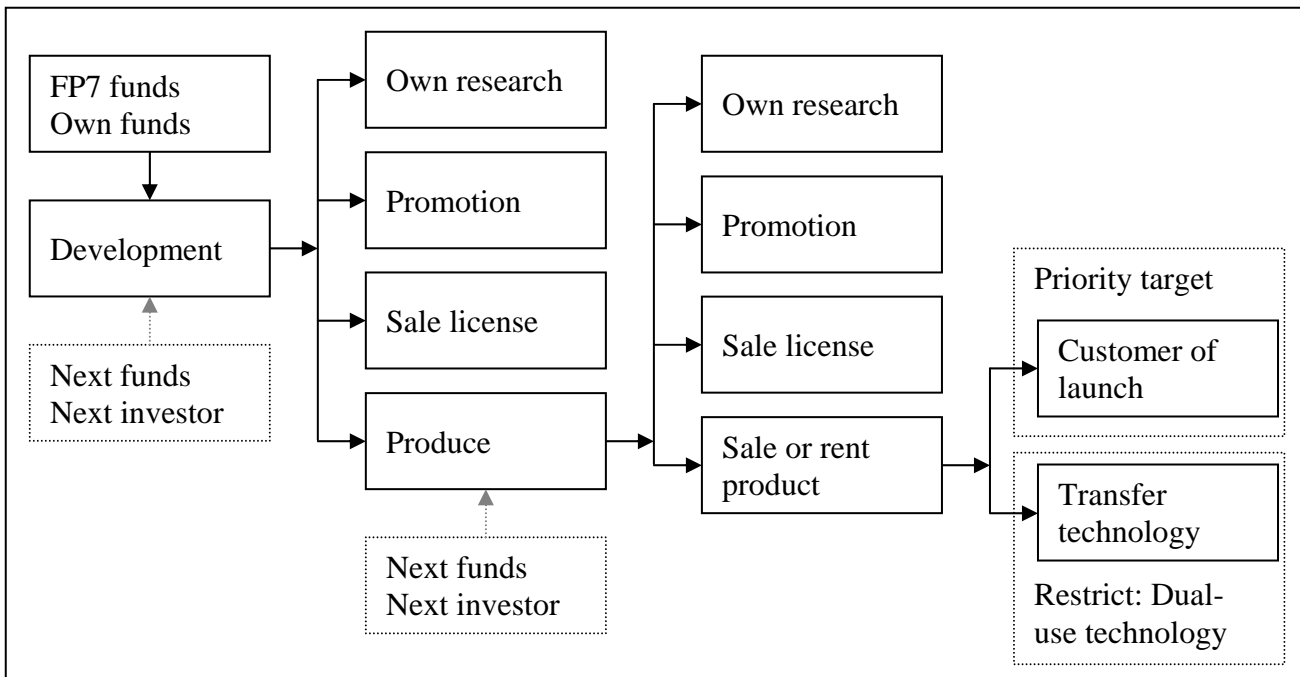
# The achievement

*Usable easy solution, existing technology, known processes.*

## Development

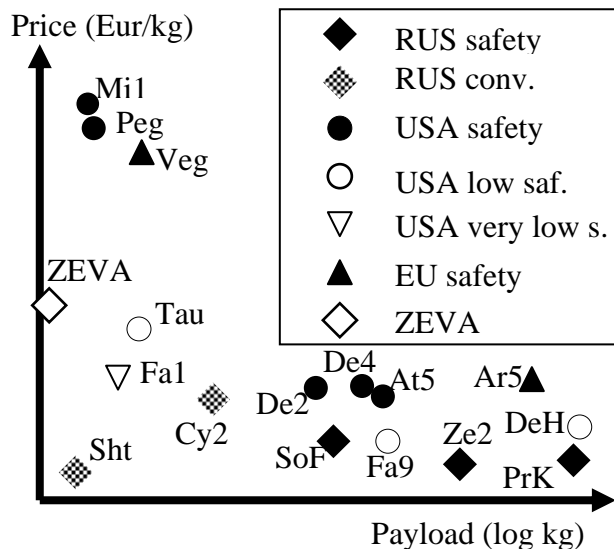


## Funds and profit



The parallels

Diagram: Price rocket (of transport kg on LEO) / total masse payload



- |               |               |
|---------------|---------------|
| Ar5 Ariane5   | Mi1 Minotaur  |
| At5 Atlas5    | Peg Pegasus   |
| Cy2 Cyklon2   | PrK Proton K  |
| De2 Delta2    | Sht Shtill    |
| De4 Delta4    | SoF Soyuz Fr. |
| DeH Delta He. | Tau Taurus    |
| Fa1 Falcon1   | Veg Vega      |
| Fa9 Falcon9   | Ze2 Zenit2    |

Diagram: Safety curve

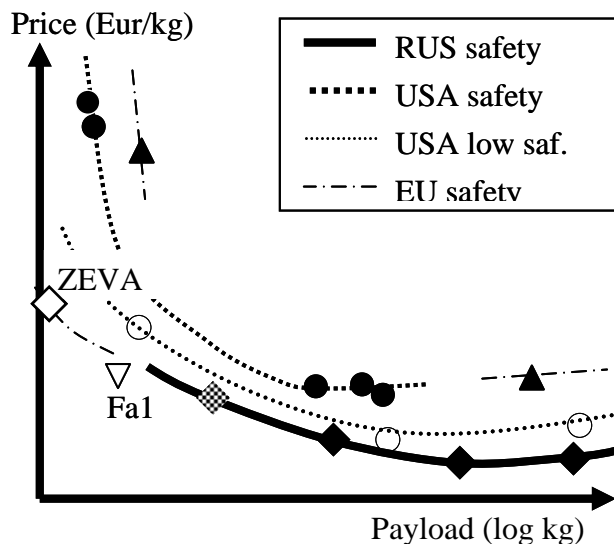


Diagram: Rockets in EU production

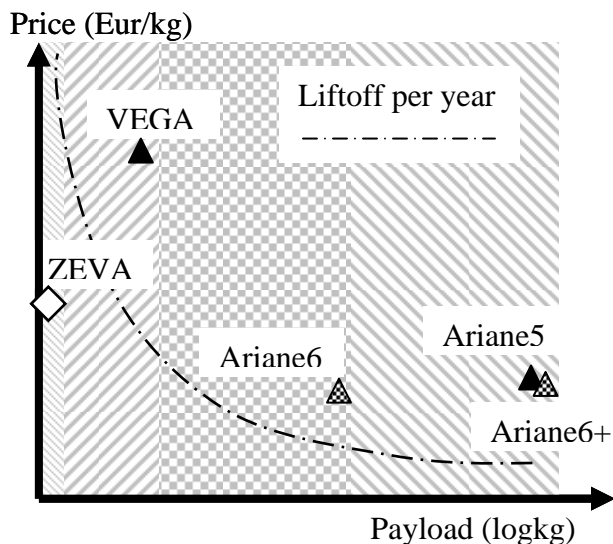


Diagram: Total price of liftoff

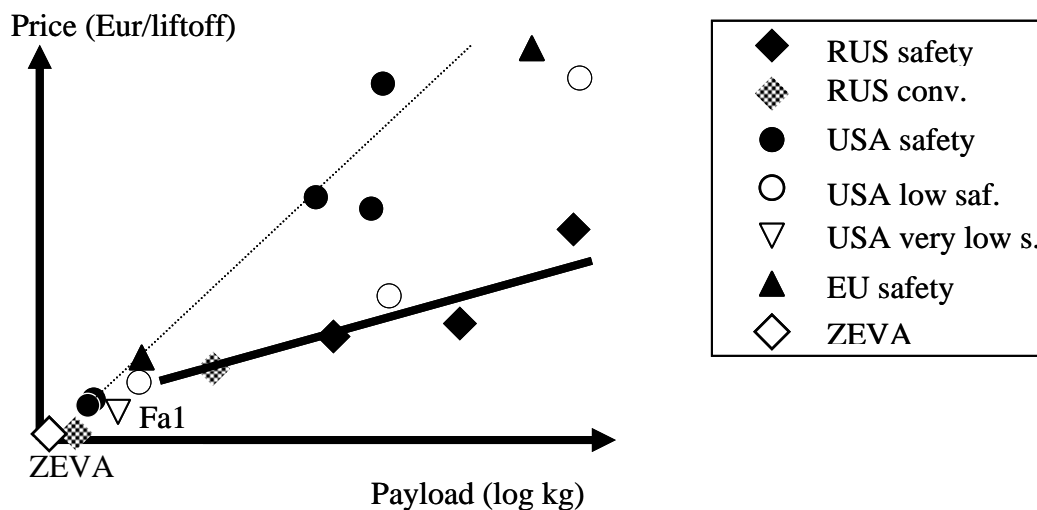
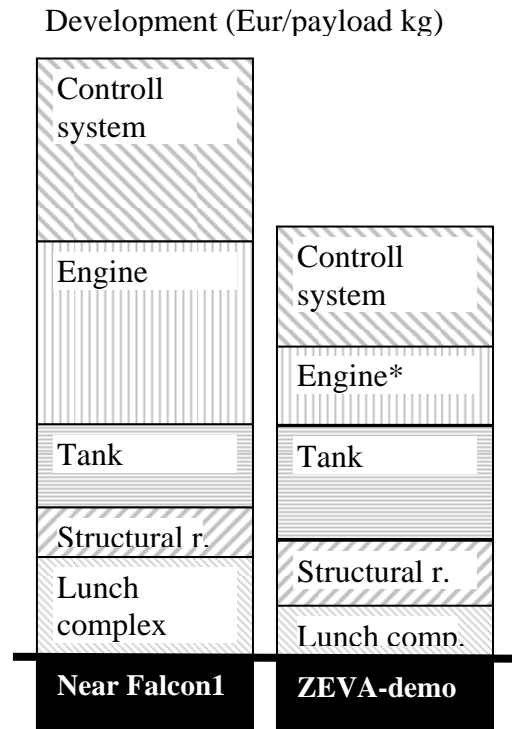
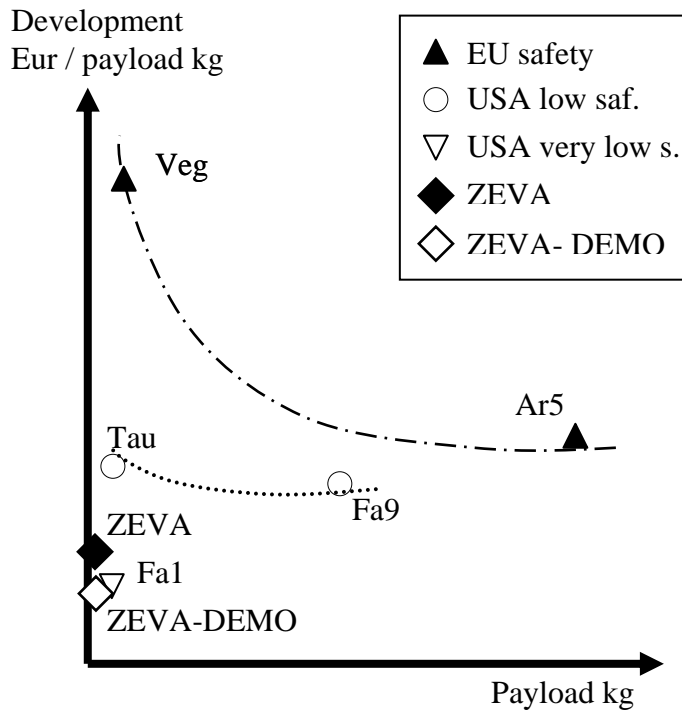


Diagram: New priority solution in development



*\*pressure-fed rocket engine, easy lunch complex*

Diagram: Ratio = mass : payload

Country	rocket	payload	mass	ratio
USA	Delta IV	8 600 kg	249 500 kg	29
EU	Ariene V	21 000 kg	777 000 kg	37
RUS	Soyuz - fregat	7 800 kg	305 000 kg	39
USA (history)	Saturn I	9 000 kg	509 660 kg	56
USA	Falcon1	670 kg	38 555 kg	58
EU	Vega	1 500 kg	137000 kg	91
Chinese (history)	Long March 2A	2 000 kg	190 000 kg	95
<b>EU</b>	<b>Zeva – MDS*</b>	<b>20 kg</b>	<b>3 005 kg</b>	<b>150</b>
IRAN	Safir	50 kg	26 000 kg	520
RUS (history)	Sputnik	500 kg	267 000kg	534
USA (history)	Juno 1	11 kg	29 060 kg	2 642

\* Easy solution