# FIRST LATVIAN SATELLITE

# VENTA-1

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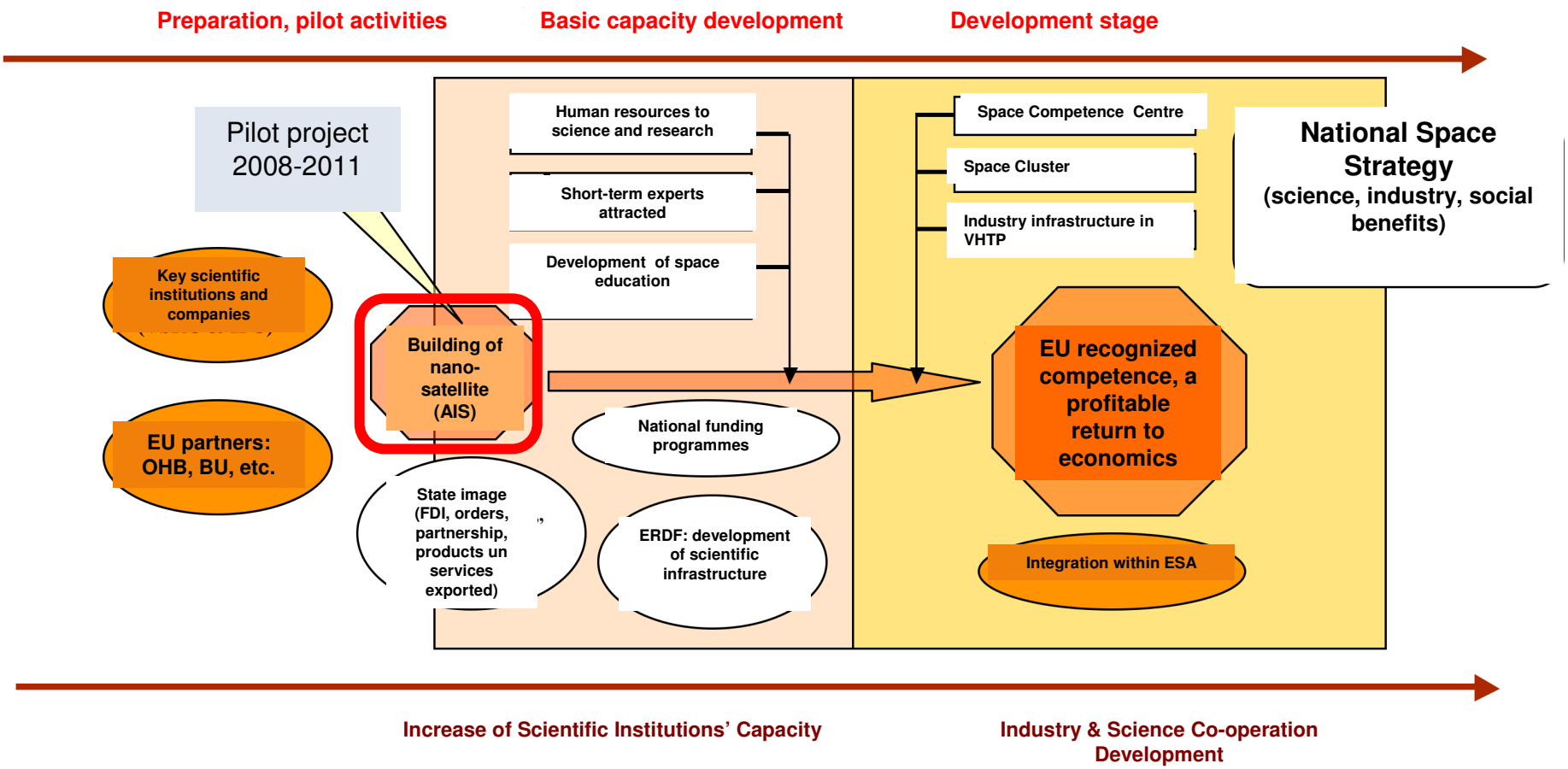
**Space Downstream Services 2010, Tallinn, 06.05.2010.**

# DEVELOPMENT OF SPACE TECHNOLOGIES IN LATVIA




**GOAL:**
**INTEGRATION OF LATVIAN SPACE CAPACITIES INTO THE EUROPE'S SPACE MARKET**

# VENTA-1: PARTNERSHIP

SMARTRegions

## VENTSPILS HIGH TECHNOLOGY PARK

## VENTSPILS UNIVERSITY COLLEGE

## UNIVERSITY OF APPLIED SCIENCES BREMEN

VENTSPILS AUGSTSKOLA

Latvijas Republikas Izglītības un zinātnes ministrija

ViRAC

DLR

Institut für Raumfahrtsysteme

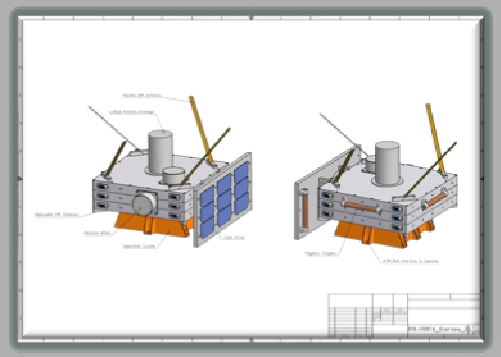
OHB SYSTEM

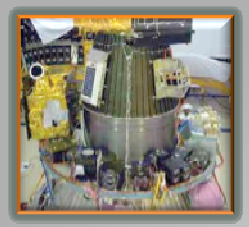
rubinX

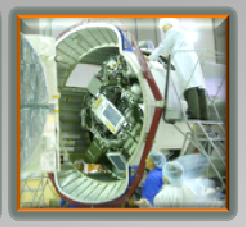
AISat

University Nanosatellite from Bremen for Maritime Space and AIS Technology Development AISat

# VENTA-1







| | |
|---|---|
| **MISSION** | • AIS (AUTHOMATIC IDENTIFICATION SYSTEM) SPACE APPLICATION DEVELOPMENT<br>• DEVELOPMENT OF A NEW NANO-SATTELLITE PLATFORM CONCEPT FOR TECHNOLOGY DEMONSTRATIONS AND PROTOTYPE MISSIONS |
| LAUNCH DATE | Q1 2011 |
| LAUNCHER | INDIA, PSLV |
| CLASS | NANO-SATELLITE |
| WEIGHT | 5-12KG (depending on the final payloads) |
| ORBIT | 600KM |
| TYPE | COMMUNICATION, NAVIGATION |
| PAYLOADS | MAIN: AIS DATA RECEIVER<br><br>SECONDARY: LOW RESOLUTION CAMERA, SATTELLITE LASER RANGING RETROREFLECTOR, GPS RECEIVER |

HOCHSCHULE BREMEN
UNIVERSITY OF APPLIED SCIENCES

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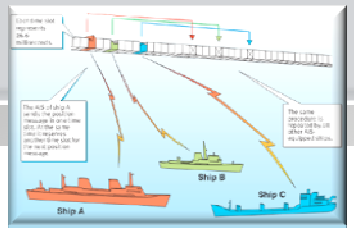
# WHY AIS?

**AIS – AUTOMATIC IDENTIFICATION SYSTEM (MARITIME)**

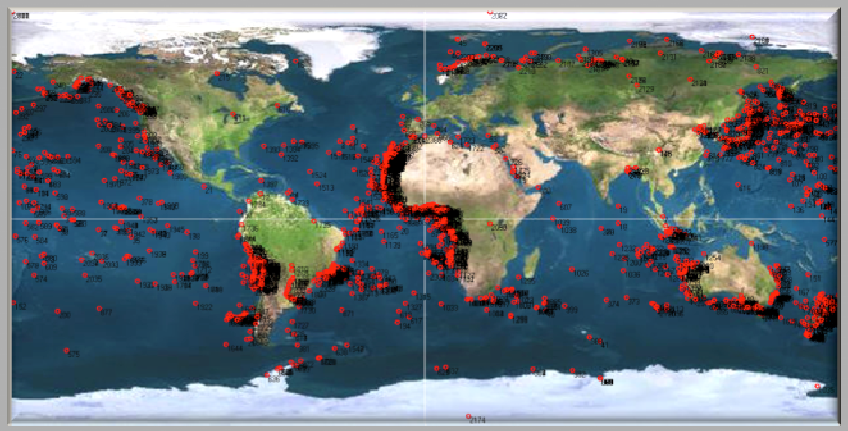
**GLOBAL INFORMATION SYSTEM IS POSSIBLE ONLY VIA SPACE BASED RECEIVERS**

**SEVERAL ONGOING SPACE BASED AIS ACTIVITIES IN EUROPE AND WORLDWIDE (e.g. EU and ESA AIS studies, OHB, LuxSpace, Orbcomm, ComDev AIS missions in LEO)**

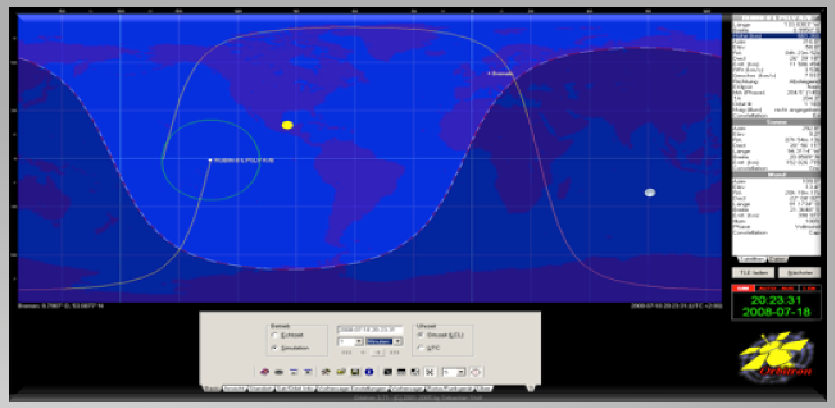
**AIS PAYLOAD ON VENTA-1 WOULD CONTRIBUTE TO THE SPACE BASED AIS TECHNOLOGY DEVELOPMENT, DATA SERVICES AND APPLICATION DEVELOPMENT**




Principle of time-slots for AIS

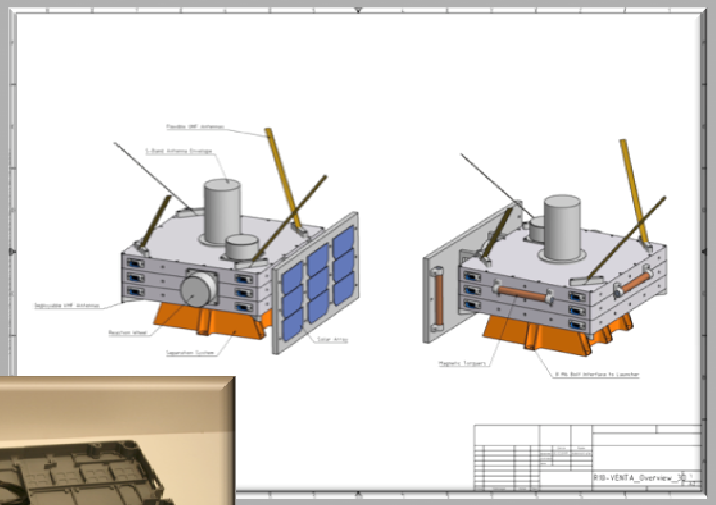


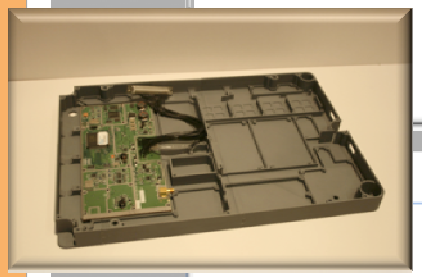
Example of AIS data from Rubin-7-AIS Mission (02.06.2008 – 19.11.2009)



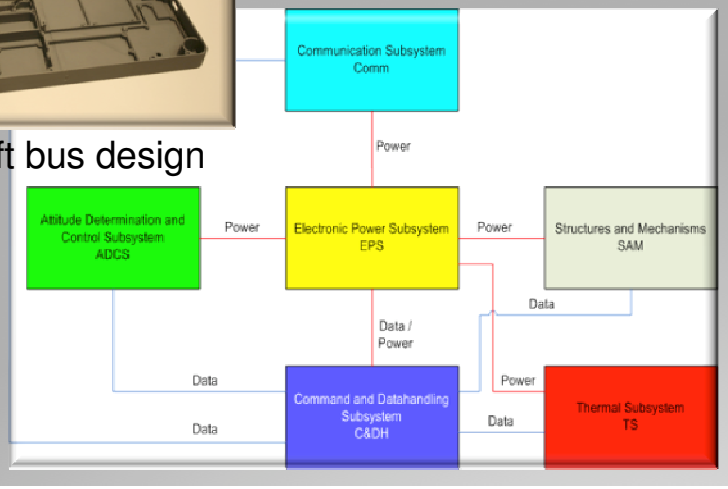

Typical flight path for Venta-1

# PRESENT (minimal) DESIGN OF VENTA-1





Spacecraft bus design




Bus subsystems overview

**BASED ON QUADSAT DESIGN DEVELOPED AT THE UNIVERSITY OF APPLIED SCIENCE BREMEN (similar to AISat Spacecraft for DLR Institute of Space Systems, Bremen)**

**Core model dimensions 250x250x25mm (one stack)**

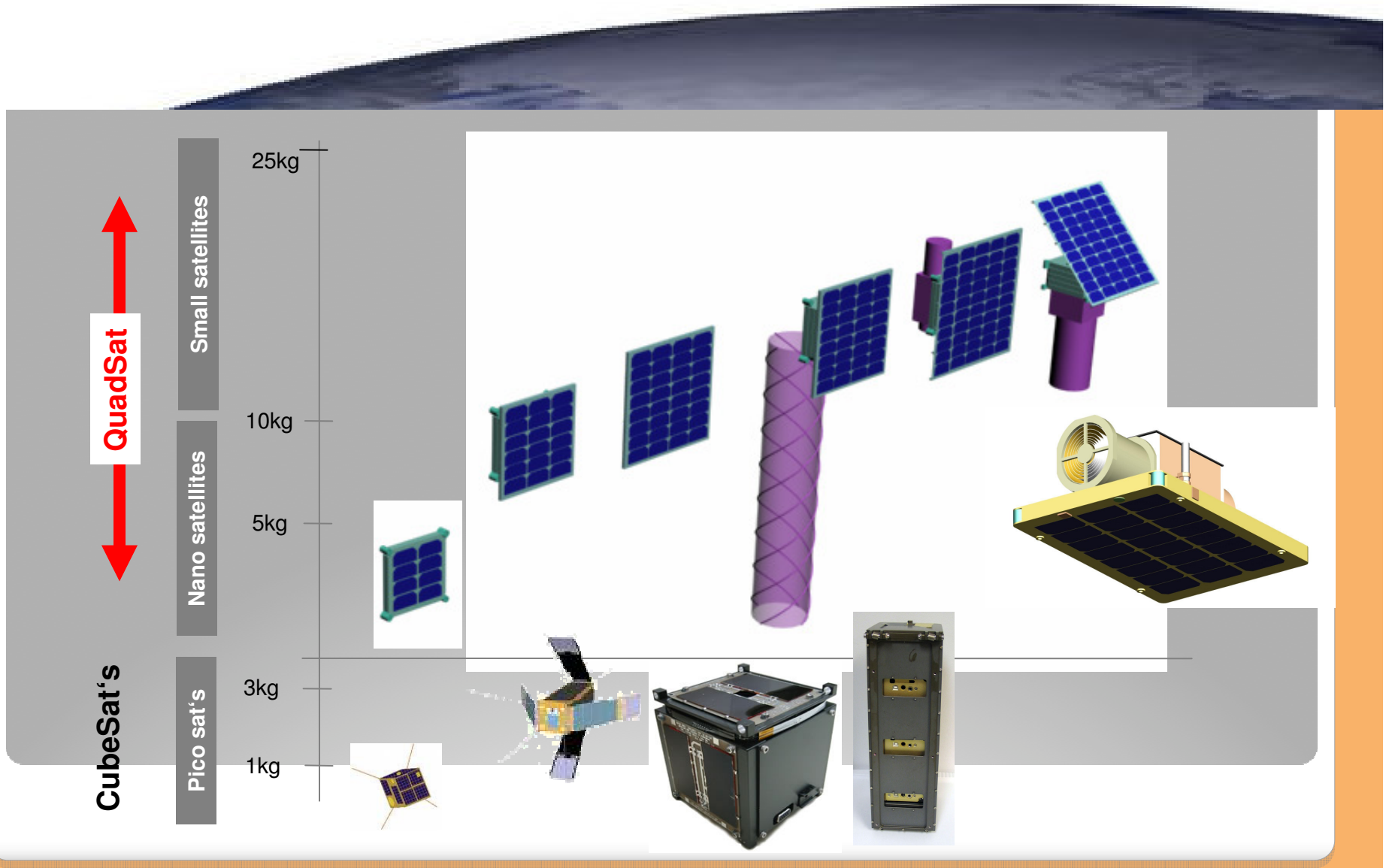
**Total mass – 5 kg**

**Gravity gradient assisted by magnetic torquers and a small RW**

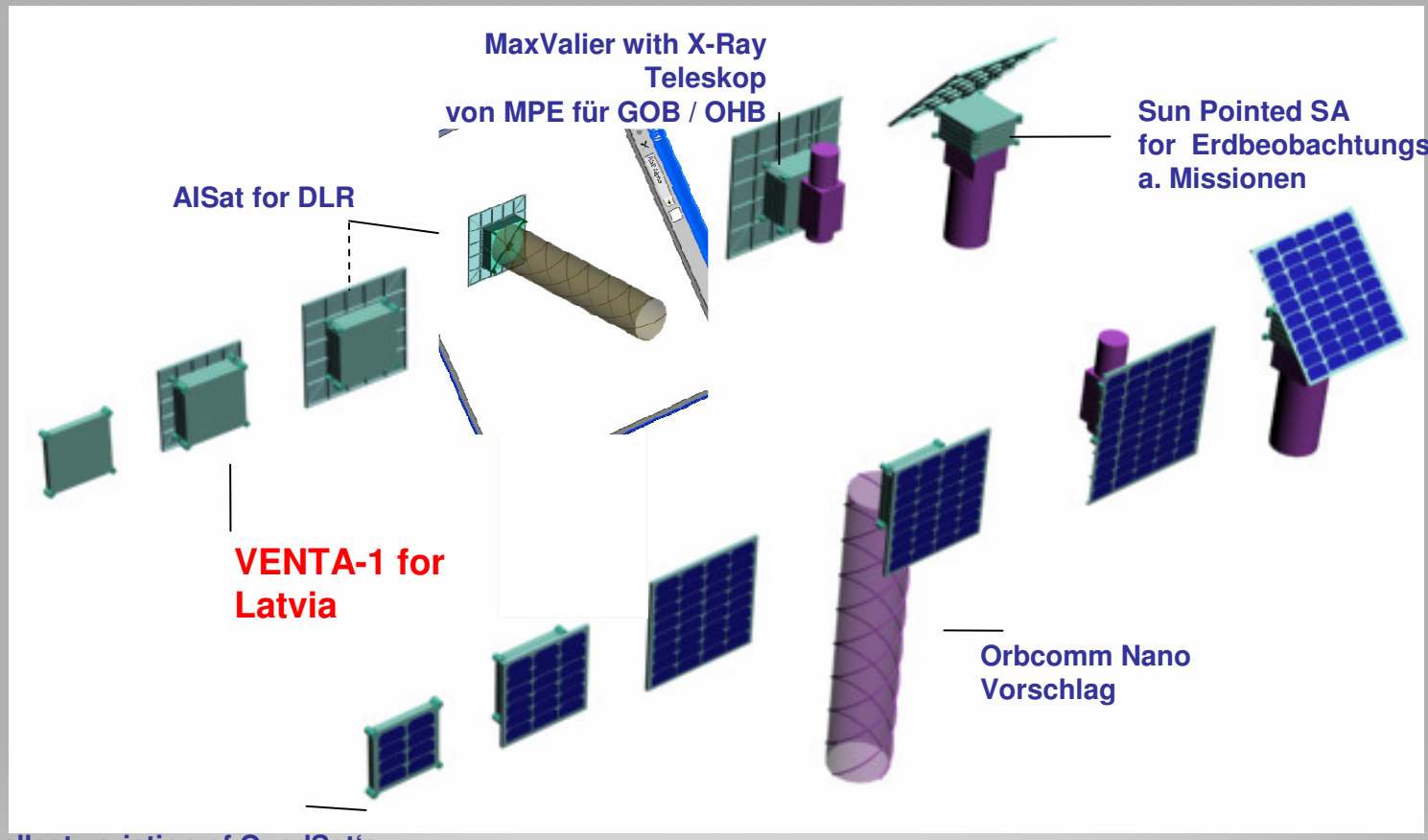
**Power system voltage 13..16V**

**TM-TC System via UHG, S-Band and Orbcomm intersatellite links**

# QuadSat CONCEPT (1)



# QuadSat CONCEPT (2)



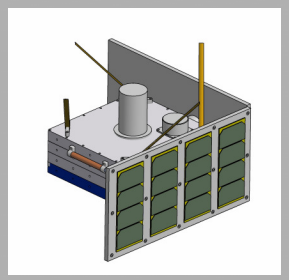

The smallest variation of QuadSat's
(Volume = 1U CubeSat
Power = 4x 1U CubeSat)

# VENTA-1 POSSIBLE UPGRADE FOR THIRD PARTY PAYLOADS

**PRESENTLY THE THIRD PARTY PAYLOAD CANDIDATES ARE:**

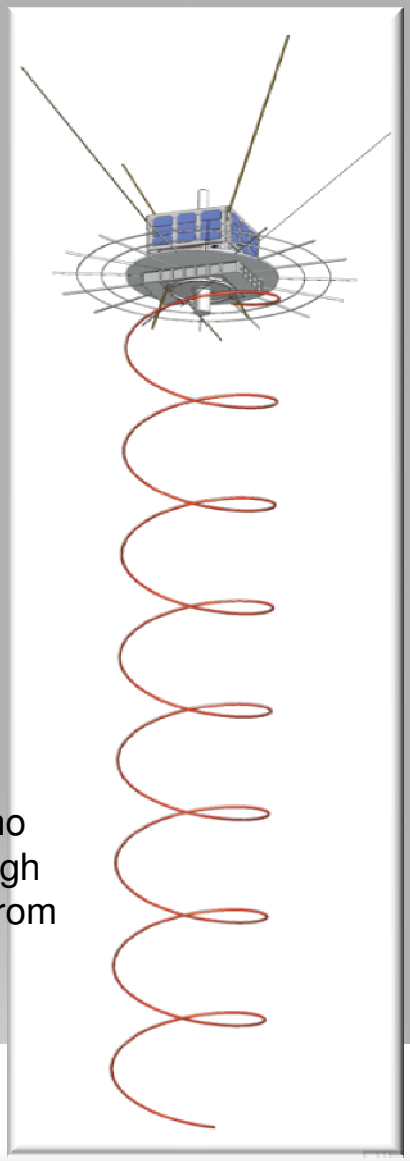
- **ADVANCED AIS RECEIVER TESTING**
- **ORBCOMM NANO PAYLOAD**

**ANY OTHER PAYLOADS AND/OR EXPERIMENTS ARE WELCOME**

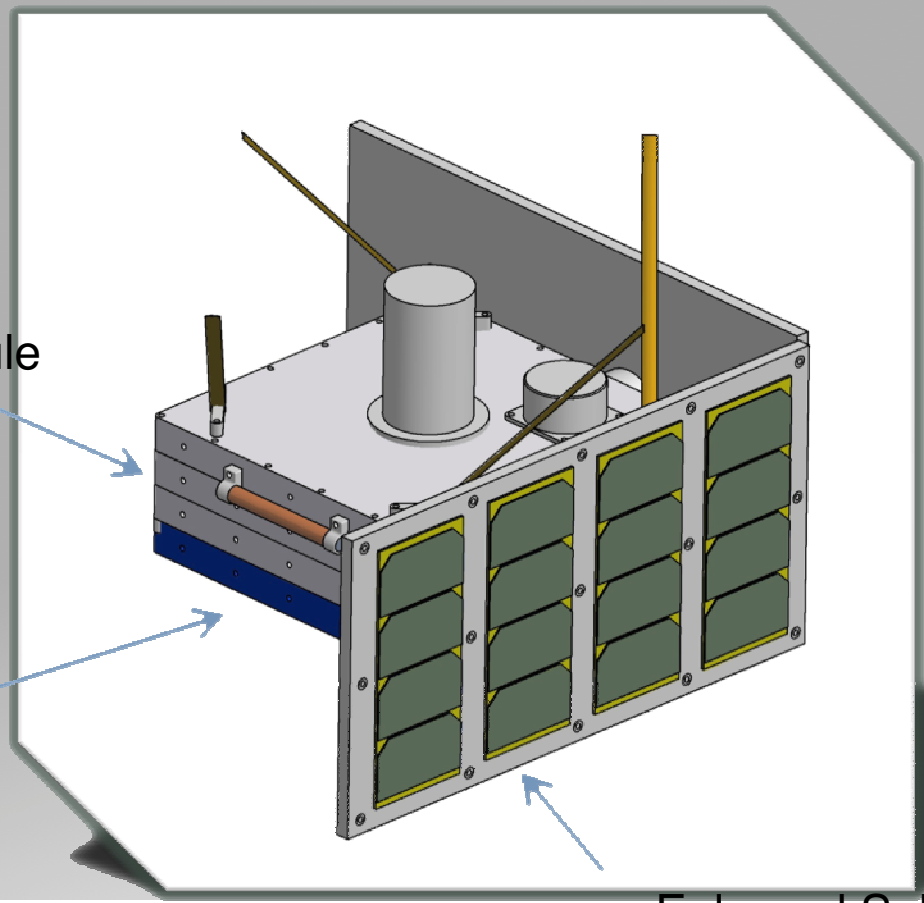


**Option#1**
(additional AIS receiver & enlarged solar array)

**Option#2**
(Orbcomm nano payload and high gain antenna from AISat)



# POSSIBLE CO-PASSENGER PAYLOADS ON VENTA-1



VENTA-1 Core Module

Available space for co-passenger payloads

Enlarged Solar Array in case of additional payloads

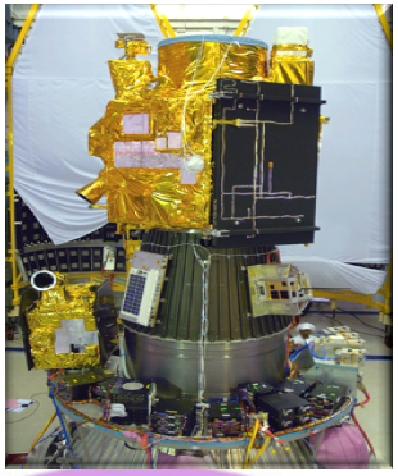
**LAUNCH DATE:**

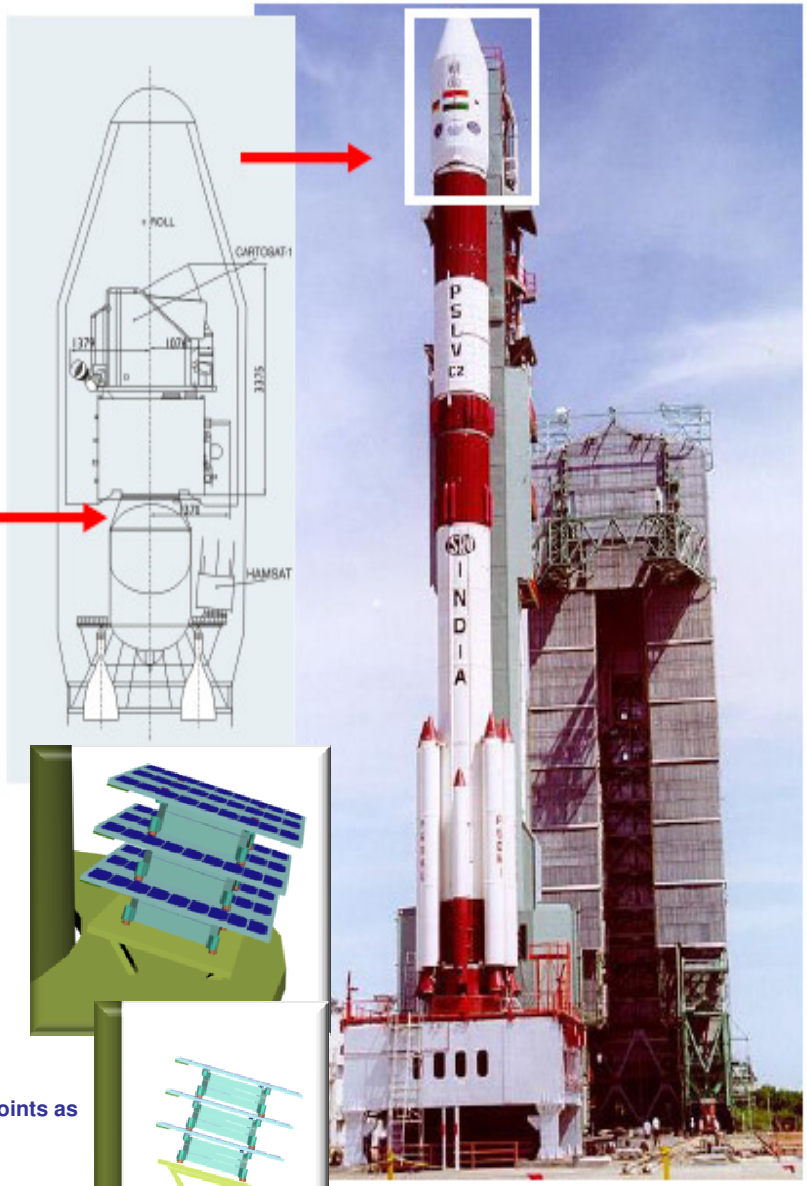
**Q1 2011**

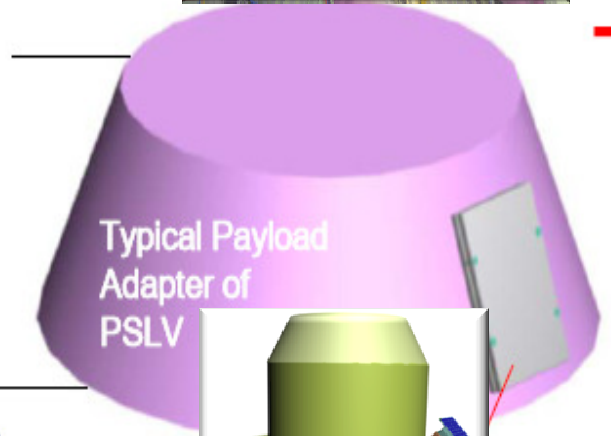
**LAUNCHER:**

**PSLV (India)**

Interface to the Main payload
(satellite not shown)





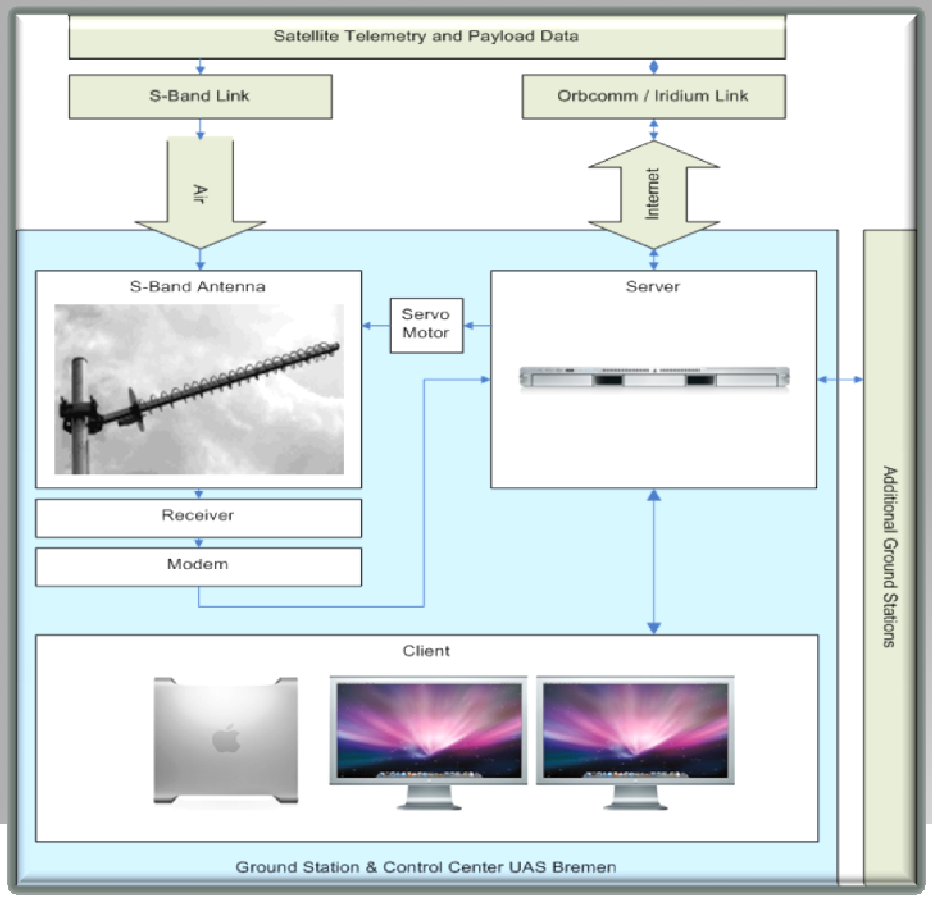

Interface to the Launch
vehicle upper stage
(upper stage not shown)



QuadSat type satellite with 4 interface points as attached payload

# GROUND STATIONS (BREMEN&VENTSPILS: Irbene)

## TM-TC System via UHG, S-Band and Orbcomm intersatellite links




# REACH THE GOALS OTHERS ARE ONLY THINKING OF!

Latvijas Republikas Izglītības un zinātnes ministrija

VENTSPILS AUGSTO TEHNOLOĢIJU PARKS

Institut für Raumfahrtsysteme

SMARTRegions

rubinX

VENTSPILS AUGSTSKOLA

HOCHSCHULE BREMEN

ViRAC

AISat

University Nanosatellite from Bremen for Maritime Space and AIS Technology Development AISat

# THANK YOU FOR YOUR ATTENTION!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