About Azista BST Aerospace.

**Who We Are:**

- Azista BST Aerospace is:
- A JV of Azista Aerospace and Berlin Space Technologies.
- Implementing large scale mass manufacturing.
Satellite Mass Manufacturing
Our Heritage.

What We Do:

• Azista BST Aerospace has:
  • Participated in 75+ missions
  • Vertically Integrated for Satellites between 50-150kg
Old vs. New (Space)

• Old Space:
  Companies: 50+
  Team Size: 25+ per device
  Time to built: 2+ years
  Cost: Millions per device
  Global Production: 50-100 p.a.
Satellite Mass Manufacturing
From Cars to Space. The Henry Ford Moment.

Old vs. New (Space)

• New Space:
  Commercial vs. Governmental
  Constellations vs. Single Sat
  Mission vs. Technology Focus

Result:
Industrial production technology is disrupting the space industry.
Looking Back:

- 1910 – 450,000 cars
  300+ Car Companies

- 1920 – 8,000,000 cars
  50 Car Companies

- 1929 – 23,000,000 cars
  Great 3 = 80% of the Market

The introduction of assembly belt production saw number of cars skyrocket and the number of car manufacturers dwindle.
Satellite Mass Manufacturing
Looking Back & Looking Ahead

Looking Ahead:

- 100+ constellations planned
- 25,000+ satellites planned
- Realistic: 5-10 constellations
- 5000+ satellites
- 1000+ satellites annually

New space business models require the use of (mega-) constellations. Similar to the automotive 100 years ago, this will transform the industry.
Satellite Mass Manufacturing

How Many Satellite Factories do we need

Satellite Factory:

- 1 Factory = 1000 Satellites
- 1 Factory = Global Demand
- Realistic: 3-5 Factories
- To avoid single source problem
- We will likely see the “Great 3” in satellite mass manufacturing
Satellite Mass Manufacturing
Key Indicators For A Satellite Factory

Key Indicators:

- Build Time: 1 week
- Unit Cost: <500k USD
- Production: >1000 p.a.
Satellite Mass Manufacturing

Required Core Capabilities

Core Capabilities:

• Modular Platform
• Industrialized Production
• Rapid Assembly
Satellite Mass Manufacturing
Core Capabilities: Modular Platform

Modular Platform:
- Modular Avionics
  - For target range
  - reduces design effort
- BST LEOS
  - Suited for 30-150kg
  - Well Suited for many missions
  - Flight Proven
Satellite Mass Manufacturing
Core Capabilities: Industrialized Production

Industrialized Production:

- Automated Production
  - Example: Pick & Place
    Electronic Revision 1 week

- Automated Testing
  - Example Star Tracker:
    Integration & Testing in <8h
    Target: 2h
Satellite Mass Manufacturing

Core Capabilities: Rapid Assembly

Rapid Assembly has already been demonstrated. For a known satellite it is possible to assemble the entire system in less than 1 week.
Satellite Mass Manufacturing

Sizing The Satellite Factory

Sizing the Factory:

• Input: Demand

• Input: Production Capability

• Output: Size of Factory
Satellite Mass Manufacturing

Sizing the Factory: Robots Need Not Apply.

Sizing The Factory:

- 1x Satellite
- 2 Persons (1 Team)
- 1 Week Assembly time

Note: Similar sizing required for subsystem manufacturing.
Satellite Mass Manufacturing
Sizing the Factory: Robots Need Not Apply.

Sizing The Factory:

- 20x Teams
- 20x Clean Rooms
- 20x Satellites per Week
Satellite Mass Manufacturing

Sizing the Factory: Robots Need Not Apply.

Sizing The Factory:

- 20x Satellites per Week
- 52x Weeks per year
- 1000+ Satellites per year

- Easy Scaleable
- 1 Team = 50+ Satellites
- 5 Teams = 250+ Satellites
- 20 Teams = 1000+ Satellites

Complex assembly lines are not required for a 1000+ satellites p.a.
Satellite Mass Manufacturing

Introduction to the Azista BST Satellite Factory

Our Satellite Factory:

• 100,000 sqft. Facilities
  • Clean Rooms, Labs, Offices
  • Full AIT Capability

• Team
  • 180+ people
  • 25+ years experience

• 5 Paralel Clean Rooms
  • 250+ Satellite/year (Unit 01)
Satellite Mass Manufacturing
Introduction to the Azista BST Satellite Factory

Our Satellite Factory:

• Subsystem Manufacturing
  • Already in Place
  • Team is undergoing training
  • Target 1x subsystem set per day

• Satellite Assembly
  • Cleans Rooms Operational (End of 2019)
  • First Satellite (Mid 2020)
  • Full Capability (End 2021)

• Upgrade to 1000+ Satellites
  • (in planning stage)
Satellite Mass Manufacturing
Globalized Production. Localized Assembly

USA: 
- Satellite Assembly Plant
- Specialized Payload Integration
- Secondary Launch Site

Germany:
- Main R&D Facility
- Prototype Manufacturing

India:
- Production of Subsystems
- Main Assembly Plant
- Main Launch Site

The US subsidiary of Azista BST is collaborating with a 100% domestic partner company to assemble, integrate & test restricted payloads and missions.
Satellite Mass Manufacturing
Gearing Up For The Henry Ford Moment.

Summary:

• Azista BST Aerospace is the new power-house in satellite mass manufacturing

• Vertically integrated Azista BST is the ideal partner to deliver all parts of your mission.

• Azista BST’s satellite factory has an initial capacity of 250+ satellites per year and can easily be scaled to meet demand.

More Questions:
Come Visit us at Booth #83
(down the hallway direction University Inn)
## Satellite Mass Manufacturing

**LEOS Platform for Demanding Missions: Sub-meter EO**

<table>
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<tr>
<th>Parameter</th>
<th>TDI Sensor</th>
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| **System Parameters** | 600x600x800mm³ / 105kg  
5 Year Design Life  
Based on LEOS-100HR Bus |
| **Payload**       | 500mm Aperture F/5.6  
0.5m GSD PAN / 2.0m GSD MS @ 500km  
MTF > 10% at Nq., SNR > 100 at Nadir Speed  
16.0 km swath  
5 Channels (RGB NIR & PAN), 2TB storage |
| **Bus**           | Very Fast Target Pointing (5°/s),  
S-Band TT&C, 320Mbit/s X-Band Data,  
Fully Encrypted, Electrical Propulsion |
All Systems in House. Azista BST is fully vertically integrated.
**Our Satellites:**

- Multi Mission Capable
  - 50+ kg Payload
  - 2kW+ Peak Power
  - Opical, Comms, Radar

- Affordable. Reliable. Proven.