Our mission:
one hundred percent

company overview
Company profile

- Largest NL space company
- Part of Airbus Defence and Space
- > 95% of its business in space
- 45 years space experience

Figures 2013
- Employees: 225
- Turnover: € 62.3 million
- Order backlog: € 70.0 million

Business portfolio
- Oriented to ESA
- Commercial Space market
- Terrestrial: Defence & Science
Heritage

1970

Galileo
ET
Delay Lines
Tropomi
Envisat
Herschel
BepiColombo

2014

ANS
IRAS
ERA
Ariane 5
SCIAMACHY
Cygnus
OMI
Vega

Ariane 5
Cygnus
Galileo
ET
Delay Lines
Tropomi
Envisat
Herschel
BepiColombo
Our facilities

Airbus Defence and Space has its own facilities for assembly, integration & testing:

- A 900 sqm² cleanroom - highest point 13 meter
- Class 100.000 standard
- State-of-the-art deployment rigs
- Certified quality management system: ISO 9001, AS 9100B, AQAP 2110 and ISO 14001
- Thermal testing (temperature cycling chambers, thermal vacuum facility)
- Integration rooms
- Very large Area Solar Simulation (VLASS)
Outsourcing 2013

Total supplier turnover 2013 (projects and non-project):
- 52 M€
- for 59% (22% + 37%) spent in NL

60 percent of the projects cost are subcontracted/procured items, from which:
- 31% within the Airbus family
- 48% at NL company’s

Top 10 NL project suppliers:
1. TNO
2. Fokker Aerostructures
3. Microtechniek
4. Airborne Composites
5. ThyssenKrupp Aerospace
6. Brandt FMI
7. UMI
8. Pentacon Engineering
9. PM Aerotec
10. Neways Micro Electronics

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>TNO</td>
<td>31%</td>
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<tr>
<td>Fokker Aerostructures</td>
<td>22%</td>
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<tr>
<td>Microtechniek</td>
<td>37%</td>
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<tr>
<td>Airborne Composites</td>
<td>16%</td>
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<tr>
<td>ThyssenKrupp Aerospace</td>
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<td>Brandt FMI</td>
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<td>UMI</td>
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<tr>
<td>Pentacon Engineering</td>
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</table>
Business Units

Structures

Solar arrays

Instruments & Systems

R&D
Business Unit Solar Arrays
Business unit Solar Arrays

Current Products
- Advanced Rigid Arrays (‘ARA’) for medium/high power range (communication and large science satellites)
- 'Flatpack' for large Earth observation platforms
- ‘FRED’ solar arrays for low/medium power range (Automated Transfer Vehicle, smaller science or earth observation satellites)
- Specials (body mounted panels, combination with heat shields)

Technical Capabilities
- Deployable and body-mounted flat panel solar arrays
- Power range : 0.5 – 20 kW
- Silicon and state-of-the-art Gallium Arsenide cell panels
Current programs

- Galileo - navigation
- Cygnus - ISS cargo
- Sentinel 1 - Copernicus
- Sentinel 2 - Copernicus
- BepiColombo - science
- ATV - ISS cargo
- AstroTerra & Seosat - Earth Observation
Business Unit Structures
Ariane 5 Engine Thrust Frames

- Efficient, complex loaded structures for Ariane 5
- Currently 6 shipsets per year for BME and ESC-A
- Production next batch (PB+) of 18 models planned for 2014-2017
Vega Interstage 1/2

- Development and qualification by Airbus Defence and Space
- Assembly at Airbus Defence and Space Netherlands premises, including TP, equipment and pyro systems
- Production of current batch of 5 almost finalized
  - First three I/S operated flawlessly
- Next batch of 10 under negotiation
  - Delivery 2015-2018
Ariane 6 - Key for business continuity

Airbus Defence and Space aims for development and production of
- Upper stage ETF
  - Commonality product with A5ME
- Aerostructures
  - Interstage 1/2, Interstage 2/3 and Lateral boosters/forward shroud
  - Solutions in Alu and CFRP have been proposed in frame of ESA RFP (Feb. ‘14)
- It is key to participate in phase A/B1 to obtain industrial position
Business Unit Instruments & Systems
Business unit Instruments & Systems

Instruments
• Instruments are top priority for NL
• Main heritage from developing innovative optical atmospheric EO instruments: SCIAMACHY on ENVISAT, OMI on EOS-Aura, Tropomi for S5P
• Customer base: ESA, NASA, ESO, large
• European primes, Dutch government
• Additional heritage for Life Science & Physics instrumentation

Systems
• Verification & Simulation ‘Center of Excellence’ for ESA
• EuroSim based Simulators used by ESA, European Space Industry
• AOCS (ISO, SAX, Herschel/Planck, EUCLID, …)
• Contract Lockheed Martin for Embedded Training JSF
Earth Observation instrument Tropomi

- High Resolution Sun backscatter trace gas instrument
- UV-VIS-NIR-SWIR wavelengths
- Funded by NSO and ESA. KNMI/SRON are PI/co-PI
- Airbus Defence and Space is prime contractor, supported by NL partners (TNO, Mecon, SRON, and other)
- Launch 2015
Business Unit New business
High Performance Radiator based on flexible foil

**Value proposition**
1. Inexpensive compared to Alu radiators
2. 50% less cost, 50% less mass, 5% more performance
3. Scalable, can be combined with different heat transport technologies
4. Suitable for deployable designs
5. Simple design, low risk

**Applications**
- Telecom East / West radiator
- Telecom Deployable radiator
- Telecom/EO auxiliary (ext. and int.) radiators
- Special mission radiators (EO, Science, telecom)

**Customers**
- Airbus AT (E3000N, NeoSat) launching customer for telecom product development
- Extend to global market

**Graphite sheets from consumer electronics** + **Multi Layered Insulation** = **Foil Radiator Blanket**

Airbus Defence and Space patent pending
Stackable Platform Structures

Value proposition
1. Efficient use of spare launch capacity / shared launch cost
2. Competitive European nanosat and microsat launch facility
3. Scalable, using the same shared launch principle
4. Evolution to wide variety of free flying spacecraft

Applications
1. Cubesat launches (SPS-1)
2. Microsat launches (SPS-2)
3. Simple to more elaborate free flyers (SPS-3)
4. LEO sats and small GEO sats (SPS-4)

Customers
1. Cubesat and microsat launch brokers (such as ISIS in Delft)
2. Primes smaller satellites
3. Launcher integrators
4. Launch operators
Articulated Deployment Systems

**Value proposition**
1. Increasingly compact and complex S/C drives need for deployables
2. Enables large focal lengths
3. Modular approach
4. Configurable to satellite requirements
5. Cost effective design
6. S/A mechanism heritage

**Applications**
- Airbus AT – A-ADS launching customer. Co-development
- Near term telecom
- NeoSat
- OHB Elektra (A-ADS, P-ADS)
- Lead
- OSC (A-ADS, P-ADS)
- Lead

**Customers**
1. Deployment of complex antenna configurations
2. Deployment of thrusters
3. Commonality with A-ADS reduces cost
PROCURED ITEMS AND SERVICE OF POSSIBLE INTEREST

- **SOLAR ARRAYS & MECHANISMS**
  - Containers (~ 60 M^3 humidity and temperature controlled)
  - Integration tools and jigs (Al and RVS)
  - High precision machined parts for mechanism (Al and Ti)

- **STRUCTURES**
  - Heat pipes
  - Forgings, sheet metal plate, machined parts (Al)
  - Containers (~ 10-200 M^3)
  - Integration tools and jigs (Al and RVS)

- **INSTRUMENTS & SYSTEMS**
  - Containers (1-20 M^3 humidity and temperature controlled)
  - On-board SW
  - SCOE

- **Other**
  - R&D for new product and technology development
Thank you for your attention
Airbus Defence and Space Netherlands

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