• ALCATEL ALENIA SPACE - ESPAÑA

• Satellite systems
  – Transparent
  – Regenerative
  – Hybrid

• Questions and answers
Alcatel Alenia Space España, is a Spanish company founded at the end of 1988, integrated in Alcatel Alenia Space and devoted to the competitive Development and Supply of Electronic Equipment and Subsystems for Space applications.
Alcatel Alenia Space - España

- Orders received: 27,4 M€
- Staff: 170 people
- R & D Expenses: over 7% of sales
- 70 % University Degrees
Three product lines

• Passive RF
  - X, Ku, and Ka Band Input Multiplexers (IMUX)
  - Filters, Diplexers, and other Passive Devices from S to Ka Band
  - Microwave Assemblies (RF Distribution units, etc).
  - Dielectric Resonator, Waveguide and Coaxial Technologies

• TTC and Active RF
  - S and X Band TTC transponders, spread spectrum transponders and transceivers
  - L to Ku Band TTC Transmitters and Beacons
  - Customised RF Units: transmitters, receivers, modulators...
  - TTC Subsystems
Three product lines

- **Digital Electronics**
  - Alcatel 9343 DVB On-Board Processor.
  - Base Band Processor (BBP), Wide-Band Digital Payload (WBDP/L), Memory Switch ASIC, Advanced Demodulators, DVB Syst. Definition Study/Demod./Demux. ….
  - On Board Data Handling Units:
    Remote Terminal Unit (RTU) / Payload Interface Unit (PIU), / Avionic Interface Unit (AIU)... 
  - Control Electronics Equipment:
    Antenna Pointing Mechanism Electronic (APME) / Solar Array Drive Electronic, (SADE) ….

- **Plus CTO department**
  - R&D management
  - System activities
AGENDA

• ALCATEL ALENIA SPACE - ESPAÑA: some figures

• Satellite systems
  – Transparent
  – Regenerative
  – Hybrid

• Questions and answers
Transparent architecture

User to HUB

DVB-RCS
DVB-S / S2
Regenerative Payloads in Satellite Communications

Transparent architecture

User to user

DVB-RCS
DVB-S / S2
Regenerative Payloads in Satellite Communications

What is regeneration?

DVB-RCS Transparent
DVB-S Transparent

AMERHIS
Regenerative Cross-Connected Multi-Spot
Regenerative architecture
Regenerative architecture

Added values: mesh communications

<table>
<thead>
<tr>
<th>Hub</th>
<th>OBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-way delay</td>
<td>~600ms</td>
</tr>
<tr>
<td>Bandwidth used</td>
<td>x2</td>
</tr>
</tbody>
</table>

One-way delay ~600ms
Bandwidth used x2

One-way delay ~300ms
Bandwidth used x1
Regenerative architecture

Added values: multicast multiple spots

- **Hub**
  - Uplink/Downlink: 3/3
  - One-way delay: ~300ms

- **OBP**
  - Uplink/Downlink: 1/3
  - One-way delay: ~300ms
Regenerative Payloads in Satellite Communications

Added values: direct video contributions

Hub
- Uplink/Downlink: 2+3/2+3
- One-way delay: ~600ms

Spot 1
Spot 2
Spot 3

Content Provider

OBP
- Uplink/Downlink: 2/3
- One-way delay: ~300ms

Spot 1
Spot 2
Spot 3

Content Provider
Regenerative architecture

Actors in the system

ON-BOARD PROCESSOR A-9343

MANAGEMENT STATION

RETURN CHANNEL TERMINALS

GATEWAYS

Regenerative Payloads in Satellite Communications
Hybrid architecture
**Hybrid architecture**

**Added values: services optimization**

**Star communications**
External networks access

**Mesh communications**
Real-time applications

Hub

Spot 1

ISP

ISP network

Content Provider

ISP Server

Content

Portal

INTERNET

Internet Servers

Router

RSGW

Spot 2

Spot 3

Hub OBP

Spot 1

Spot 2

ISP

ISP network
REGENERATIVE PAYLOADS IN SATELLITE COMMUNICATIONS

QUESTIONS...

ALCATEL ALENIA SPACE - ESPAÑA