The invention of the network camera and the VLSI technology behind

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Axis

> Founded in 1984
> IT company focused on Network Video Solutions
> 1521 employees (June 30, 2013)
> Sales 2012, 4184 MSEK
> Listed on NASDAQ OMX
> Head office in Lund, close to LTH
> Own offices in 40 countries
> 55000 partners in 179 countries

www.axis.com
Original products
28 years of network intelligence

Four phases in our development
- Network video
- Storage
- Printers
- Protocol converters

Four steps in our market coverage
- Europe
- Asia
- USA
- Global
Since 1996, Axis has been driving Network Video evolution

- **1996**: World’s first network camera
- **1998**: World’s first video encoder
- **1999**: World’s #1 network camera
- **2000**: World’s first network video chip
- **2004**: First MPEG PoE camera
- **2008**: First H.264 network camera
- **2009**: First HDTV network camera
- **2009**: Lightfinder technology
- **2009**: First thermal network camera
- **2010**: First network camera with active cooling
- **2011**: Smallest PTZ camera
- **2011**: Unique high-performance WDR camera
- **2012**: First network camera Companion: unique small installation solution
- **2012**: Unique high-performance WDR camera
- **2012**: AXIS Camera Companion: unique small installation solution
Axis – continuously driving innovation in network video

1996
Off the shelf Components (VITEC)

1999
ARTPEC-1
Worlds first Network camera ASIC

2003
ARTPEC-A

2004
ARTPEC-2
Dualstream MPEG-4/MJPEG

2008
ARTPEC-3
HDTV/H.264

2009
ARTPEC-B

2011
ARTPEC-4
Lightfinder technology
The fourth phase - the invention of the network camera
1996 - AXIS NetEye 200

> The world’s first network camera

> Launched at Interop Atlanta, September 18th, 1996

> Performance
  
  – 1 image/second in 352*288 pixels
  
  – 3 frames/minute in 0.4 Mpixel

More than 10,000 sold!
One of our first camera customers…

> Steve Wozniak, co-founder of Apple
> Was in a car accident during a tech support call
> No injuries and problem was solved
World’s first video encoder in 1998

> AXIS 240 – the world’s first video encoder

> Andy Rubin, CTO & founder of Android at Google, in 1997 when he was testing AXIS 240 prototypes
# Market shares for surveillance cameras

<table>
<thead>
<tr>
<th>Rank</th>
<th>Supplier surveillance cameras 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Axis Communications</td>
</tr>
<tr>
<td>2</td>
<td>Panasonic System Networks (PSN)</td>
</tr>
<tr>
<td>3</td>
<td>Samsung Techwin</td>
</tr>
<tr>
<td>4</td>
<td>Hikvision</td>
</tr>
<tr>
<td>5</td>
<td>Pelco</td>
</tr>
</tbody>
</table>

Source: IMS Research 2012
Lightfinder technology, Wall Street Journal Technology Innovation Award

Perimeter surveillance with no street illumination during night time and approximately 0.1 lux.
In-house R&D – where the coming successes are made

> Substantial R&D investment
  - 15% of revenue
  - 580 MSEK in 2012

> Patent portfolio contains 143 patent & design patent families

> 3 corner stones
  - Innovation
  - Openness
  - Quality
Approx. 600 engineers work in Lund

Mechanics  Software  Electronics  ASIC’s
SoC content

> Embedded CPU running Linux
> Image processing pipeline
> Image scaler with dewarping
> Image compression subsystem
> Crypto accelerator
> Ethernet controller
> I/O controller
> Interfaces etc
ARTPEC-1 product
Four generations of dedicated network camera ASIC’s
ASIC challenges

- Price/Volume
- Complexity
- Project size
- Project time
- Tools
- Power
- Shrink
- Technology
Electronic design obstacles, history and future

- Power performance
  - Better architecture?
  - Embedded DRAM?
  - What else?
- Physical design complexity
  - Better methods
  - Better tools
  - Physical IP
- Verification complexity
  - Better methods
  - Better tools
- Logic design complexity
  - Better methods
  - Better tools
  - Maturing IP market
- Gate count
- Pin count
  - Moore's law
  - New package types (BGA etc)

Time:
- 1970
- 1980
- 1990
- 2000
- 2010
Development challenges

- Distance to production
- Open source
- Free information
- Crowd founding (Kickstarter etc)
- Time to market
- Quality
Consumer Electronics Trends

> Staying Connected
  - Consumers want to stay connected, at home and while traveling.
  - Portable equipment with the latest features (More important than ever)

> Media and Data Convergence
  - Media-centric TV and the data-centric computer will merge.
  - New gadgets has to handle both types of tasks and be synchronized

> In-Home Entertainment
  - 1080p will be replaced by 4K
  - Video/Music on demand
  - User interface centric equipment

> Smart home
  - Embedded devices for everything
  - Smart/Cost-efficient device integration
More trends

> **IT**
  > Cheaper and better tablets and computers
  > Moving to App-oriented business models
  > Corporate cloud solutions
  > Wider use of P2P/streaming media

> **Mobile communications**
  > User-interface for everything
  > Mobile payments
  > IPv6
  > Wearable devices
  > Real time automatic voice translation

> **Other**
  > 3D printing
  > Autonomous flying robots (Drones)
Industry Trends in Consumer Electronics

> Difficult to earn money on software
  - App-centric world
  - Customer lock-in

> Business critical technology development
  - Vertically oriented business trend
    - Apple, Microsoft…
  - Outsourced development is now moved home

> IPR
  - Patents
Display technology

> Important part of surveillance system
> Industry update (Status, Players, jobs,)
> Display market update (Outlook, Problem, Solution)
> 4K (Pixel, Size, Cost, Apple)
> OLED
> Key selling arguments (Demo, 3D, Scaling, Easy, Future)
> Trends (Flexible, Unbreakable, See-through, Touch)
> IFA2013 update
SER-Prize 2013

Gunnar Dahlgren     Per Kannermark     Martin Gren     Stefan Lundberg     Carl-Axel Alm
Get the Axis picture. Stay one step ahead.