ASML’s view on collaborative projects

Frans List – Project coordinator More Moore Projects
EFECS November 20, 2019 in Helsinki
Content

• 35 years of ASML with open innovation, driving Moore’s Law

• And the 4 Questions of the EFIECS organization:
  1. Why does your company drive, encourage and stimulate collaborative innovation projects?
  2. What expectations does your large enterprise have from setting-up and participating in such collaborative projects?
  3. How Important is the formation of ecosystems for your company?
  4. What is the impact of collaborative projects for all stakeholders, particular for the different types of project partners?
35 years ASML...

1984

- Market share (litho): 0%
- Employees: 45
- Locations: 2 (NL, US)
- Sales: € 1.2 million
- R&D: € <5 million

2019

- Markt share (litho): 87%
- Employees: >24,000 FTE
- Locations: 60 in 16 countries
- Sales: € 10.9 billion (2018)
- R&D: € 1.6 billion (2018)
…with collaborative innovation at the root of our success…
…driving the semiconductor industry: Moore’s Law

Source: Ray Kurzweil
Drive to encourage and stimulate collaborative innovation projects?

Continuation of Moore’s law

Which requires Research and Innovation in:

• Lithography
• Metrology
• Materials, Devices, Process, Architectures and Design tooling

Which together are well beyond the scope of individual organizations like ASML

And European collaboration projects have proven to be effective in this domain …
… as EUV related Collaborative Innovation Projects …

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<th>Funding program</th>
<th>2000's</th>
<th>2010's</th>
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<td>ECSEL JU</td>
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- Led by ASML
- Led by other partner

In all projects on average ~20% SME’s
...with participation of the following organizations in the most recent projects ...
...have contributed to the 1st Products using 7nm EUV technology ....


Monday, October 7th 2019

TSMC Starts Shipping its 7nm+ Node Based on EUV Technology

TSMC today announced that its seven-nanometer plus (N7+), the industry’s first commercially available Extreme Ultraviolet (EUV) lithography technology, is delivering customer products to market in high volume. The N7+ process with EUV technology is built on TSMC’s successful 7 nm node and paves the way for 6 nm and more advanced technologies.

Expectations from setting-up and participating in collaborative projects?

From the Public Private Partnerships, such as ECSEL, ASML expects that promising technologies with low TRL are developed to high TRL level, supporting our business creation.

Develop the maturity of our value chain, that is, enable partners to invest and pursue in own roadmap and business development.

All in all to **Initiate, speed-up and intensify R&D** to cope with ....

TRL – Technology Readiness Level
…an even higher demand for Moore’s law to progress than ever…

…from industry…

...and society

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**Too Much Information: Amsterdam Hits Pause on Data-Center Boom**

By Ellen Proper

July 16, 2019, 6:00 AM GMT+2

- Data centers take up lot of space, are a drain on power grid
- Dutch Data Center Association dismayed by the city’s decision

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Autonomous and connected cars drive double digit growth to 80 B$ by 2025
Importance of ecosystems for your company?

These are Essential as we are not able to do it all by ourselves

It allows ASML for the enabling technologies that drive continuation of Moore’s law:
- To focus on R&D topics in which ASML excels,
- And benefit from R&D by partners/suppliers on topics in which they excel.

It provides for having partners/suppliers from which we can buy products that we need…. “Live and let Live”
Impact for all stakeholders, particular for the different types of project partners?

Europe: Sovereignty by creating strategic control points in Electronics, Components and Systems
Enabling solution in resolving Societal Challenges

National: Economic growth & Jobs

Large Enterprise: Mature value chain, connect to eco-systems and pilot line

Small Medium Enterprise: Stability, Opportunity to exploit technology and pilot line

RTO & Universities: Program Direction and dissemination of research results

RTO – Research & Technology Organization
… expressed in knowledge, value and jobs over the past 10 years, for the present ECSEL project partners this worked out as:

<table>
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<tr>
<th>In Number of First Patent Filings</th>
<th>In Net sales (M€) in Litho-, Metrology- and Process Equipment</th>
<th>In numbers of highly skilled jobs</th>
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<td>for ASML, ASM, BG, Crytur, Demcon, FZU, IBS, imec, Pfeiffer, SCIA and Zeiss</td>
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Thanks!