Pilot line infrastructure investment in harmony with ECSEL UltimateGaN project for next generation GaN power Electronics

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Figur: Skiss över ProNanos laboratorium (A), samlokalisering med Lund Nano Lab (B) och en tillhörande kontorsbyggnad (C).
Nano/micro scale fabrication at Lund University clean room, Lund Nano Lab

Epitaxial growth of III-Vs (GaAs, InP, antimonides, nitrides, ternary compounds. Nanowires and thin films
Electron beam lithography
UV lithography
Metal deposition (sputtering, evaporation)
Etching
Structural and electrical materials characterization

Applications: Power electronics, quantum devices, LEDs, Solar cells, Sensors

RISE pilot production facility ProNano

Swedish Digital Innovation Hub for Applied Nanotechnology & Materials
NanoPilot Manufacturing Center: Testbed-, scale-up and incubator for nanotechnology based innovation
Commercialization of nanotechnology based research
First case: Nitride materials for power electronics & microLED
Filling the Gap

**Principle**

- Laboratory Equipment
- Academia
- NanoSafety

**Concept**

- Performance
- Reproducibility
- Product

**Performance**

- Mass production

**Reproducibility**

- Profiability

**Product**

- ProNano
  - Facility for pilot production
  - 50 M€ equipment

**Mass production**

- New company
- Existing company
- New company
- Existing company

**Profiability**

- Contract development

**Profability**

- Spirit Ventures
  - Venture Capital for startups
ProNano Application Focus

- **GaN power electronics**
  - Epitaxy, advanced materials characterization and know-how

- **LED technology**
  - Fabrication and characterization of advanced LED structures, demonstrators, expertise in LED technology

- **Advanced sensor solutions**
  - Advanced nanofabrication e.g. for large area plasmonic structures, nano-biosensors, optical sensor systems and electronics for sensor systems
ProNano: Bringing Nanotechnology to Market

Vision

- ProNano shall be a globally leading **pilot production plant** for **nanotechnology** products and the hub in an ecosystem that will revolutionize industries and markets, with nanotechnology products for a better tomorrow.

Mission

- ProNano facilitates **commercialization** of nanotechnology products by providing start-ups, industry and research institutes in Northern Europe with access to a globally leading pilot production plant and ecosystem for nanotechnology products.

Goals

- High adaptability – Cutting start times
- High availability – Cutting lead times
- High traceability – Cutting process optimization times

Strategy

- Establish ProNano as a globally leading pilot production plant for nanotechnology products in Northern Europe
- Establish ProNano as the hub in an effective nano ecosystem by continuously marketing ProNano towards existing and potential customers, service suppliers and researchers and interconnect
GaN is the material for the future in RF and high power electronics. In UltimateGaN, the leading European specialists in wide bandgap semiconductors will collaborate to develop the next generation of GaN power electronics.

UltimateGaN is an ECSEL project with a European consortium led by Infineon. RISE in Lund and Kista will fabricate devices and develop disruptive, high-quality GaN substrates based on nanotechnology in collaboration with SweGaN AB and Hexagem AB.
ProNano Timeline

**Phase 1**
Period 2020-2025

- Quick start in pre-existing facility, test the business model
- First technical focus on III-Nitride Epitaxy and Metrology
- “Nanohouse” Implementation (offer co-location for nanotek companies)
- First customers secured for full operation (2 shifts)
- Operational ready Q1 2020

**Phase 2**
Period 2025-

- ProNano in Science Village
- Co-location with Nano Lund / Lund University
- Establishment of large-scale Innovation Infrastructure
- 2100 m² modular clean room
- Projected total inv. volume ~50 MEUR
- Parallel planning ongoing at national and EU level