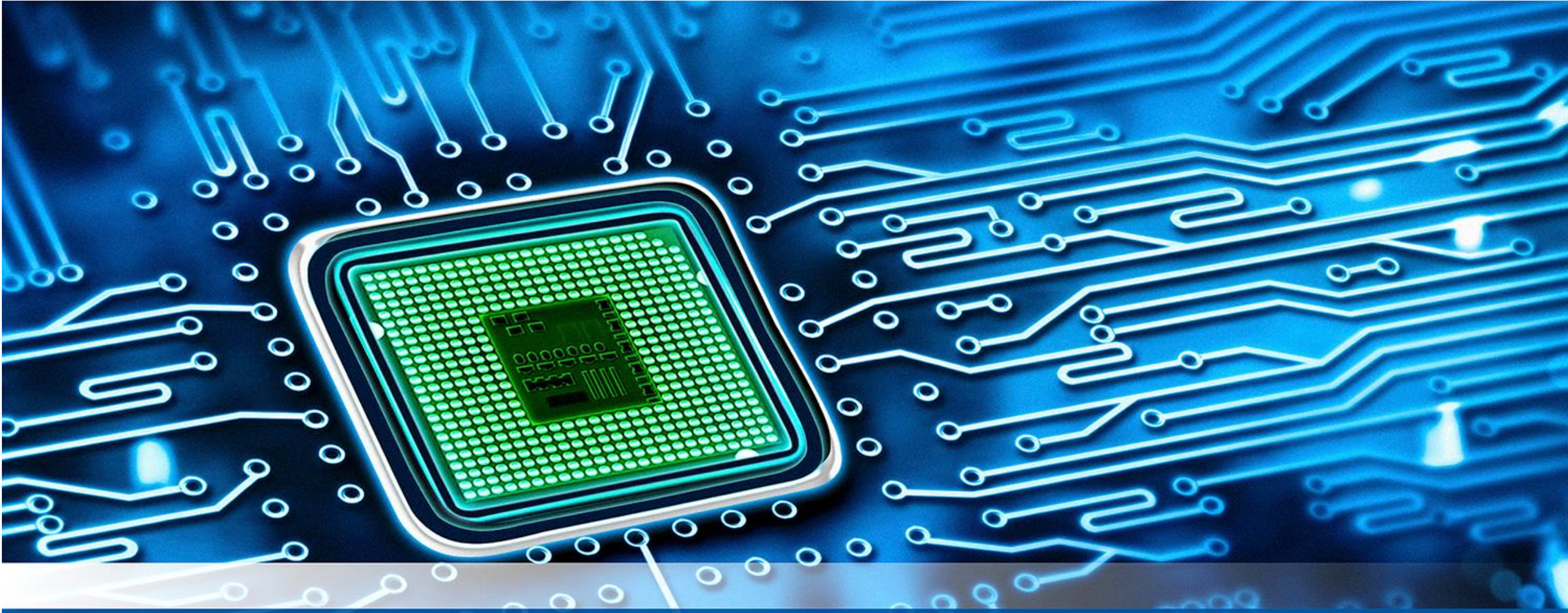
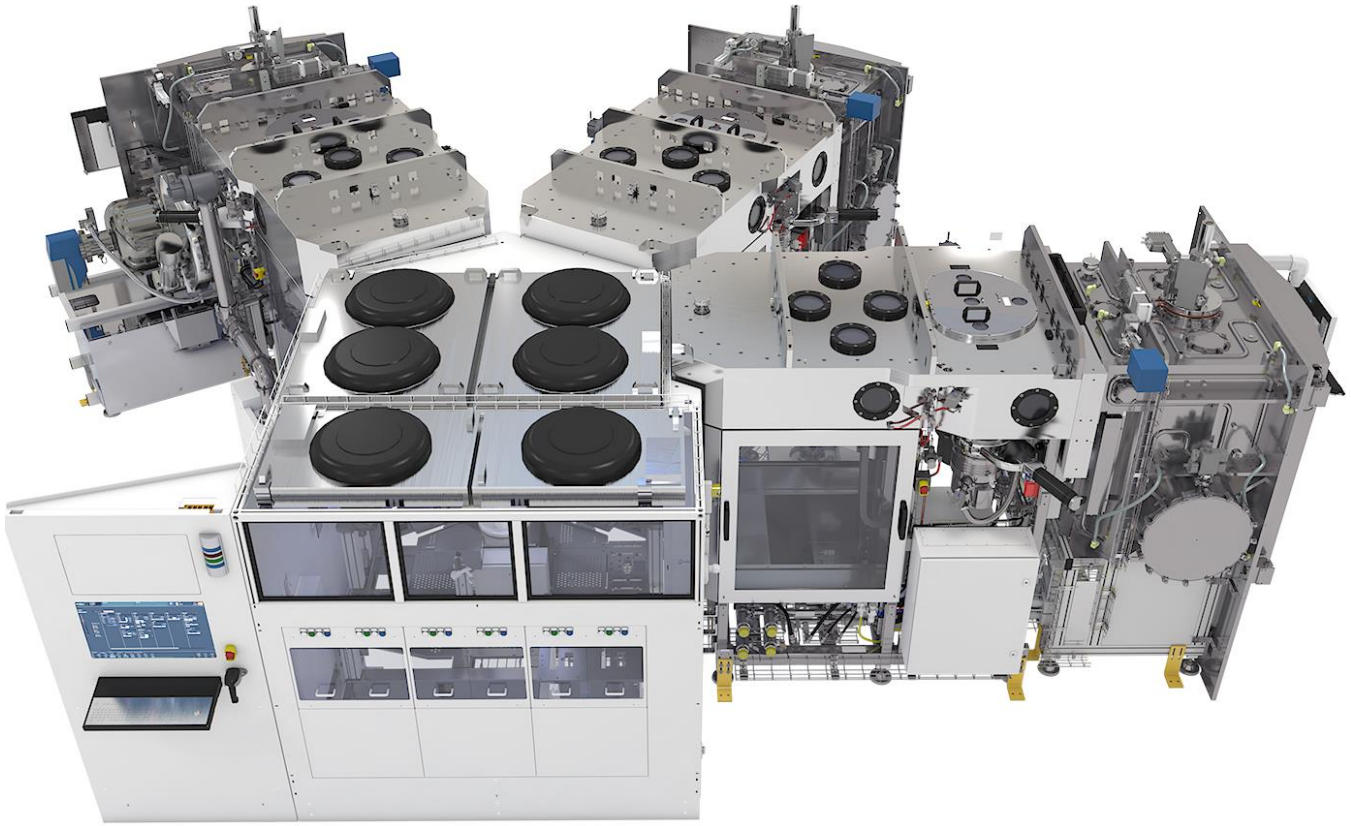


DRIVING DOWN COST OF OWNERSHIP – New high throughput “cluster” evaporation production tools for wireless applications

Fiodar Kurdzesau, SEMICON Europa, München 16-19.11.2021

evatec process systems

THE THIN FILM POWERHOUSE



To show you how new clustered high volume evaporation solutions can :

1. Increase throughput
2. Lower cost of ownership

HEADQUARTERS IN TRÜBBACH, CH GLOBAL HEADCOUNT ≈ **500**

- System assembly in class ISO7 & ISO8
- 2 levels for final equipment assembly
- Application Lab (ECL) in class ISO6 (customer demo)
- R&D facilities and metrology of >3000m^2

OUR COMPANY IS BUILT ON 70 YEARS OF KNOW-HOW

1946 — GAB GERÄTEBAU-ANSTALT BALZERS

1960s — BALZERS

1980s — balzers

2000s — unaxis

2004 — evatec process systems

2015

2021

A PORTFOLIO OF PLATFORMS THAT FITS YOUR NEEDS

BATCH

BAK

Family of evaporators from 0.5 to 2 metres with wide range of process sources and with “Autoload” options

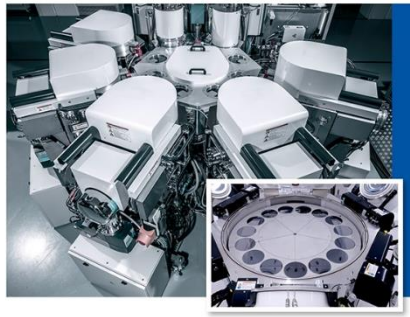
LLS EVO II

Vertical sputter for metals, dielectrics, and magnetic films

MSP 1232

Batch sputter system for mass production of high precision optical stacks

CLUSTER

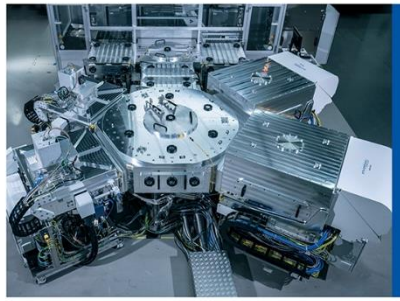


CLUSTERLINE® 200

200mm cluster platform with configuration options for single substrate or batch processing

CLUSTERLINE® 300

300mm cluster platform with configuration options for single wafer or dynamic processing in a batch module



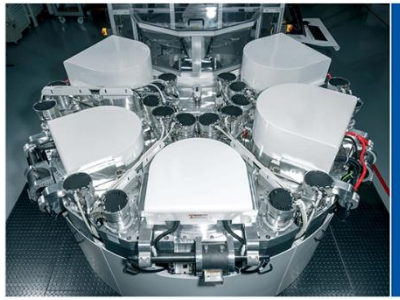
CLUSTERLINE® 600

FOPLP & IC substrate manufacturing on a cluster tool for panel handling up to 650x650mm

INLINE

HEXAGON

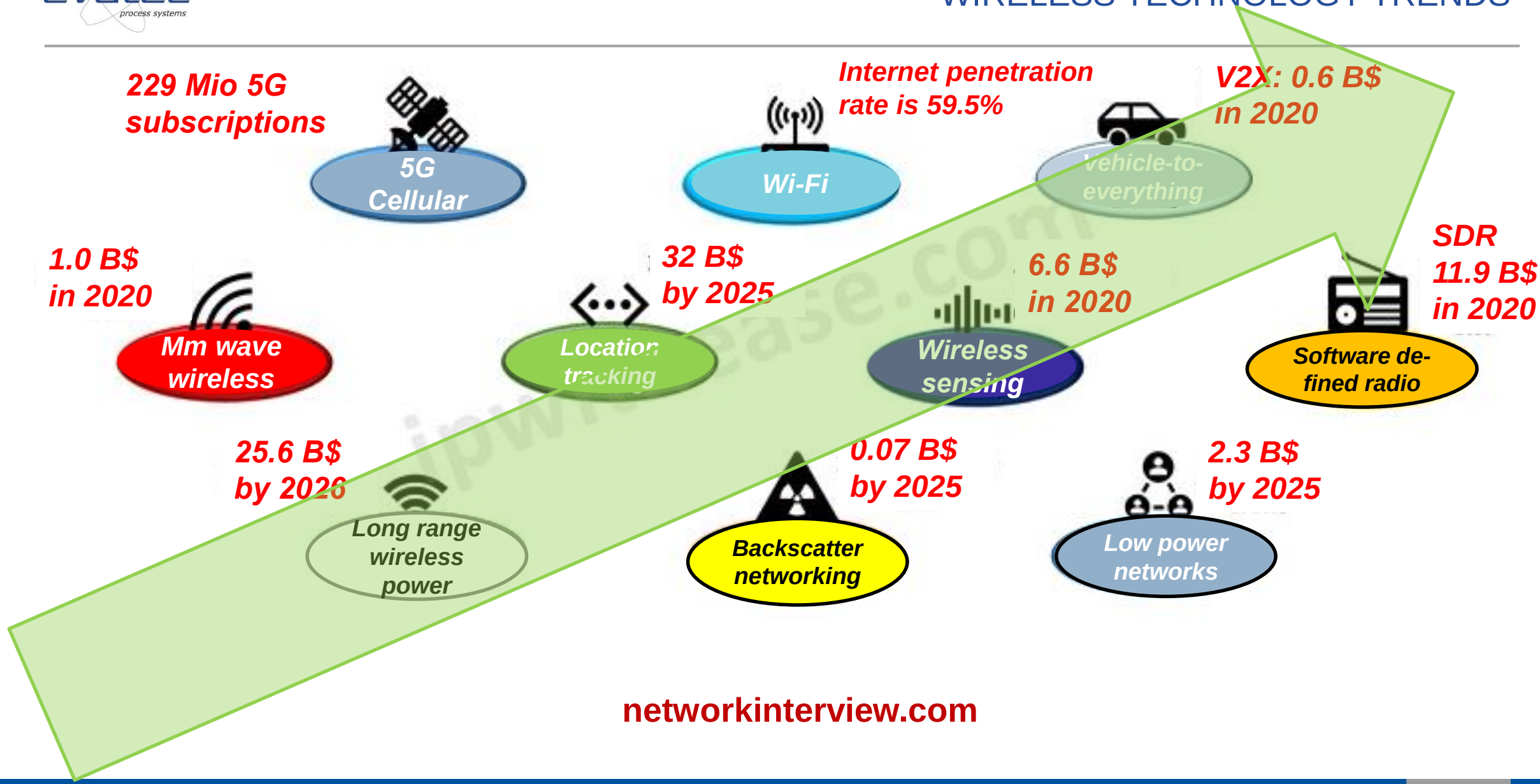
Your cost advantage in wafer level packaging processes



SOLARIS®

Family of platforms for fully automated high speed inline sputtering in single substrate chambers

WIRELESS TECHNOLOGY TRENDS



networkinterview.com

Metallization (Contacts)

Lift-off lithography (e.g SAW)

Isolation coating

E-beam evaporation

Evaporation Advantages:

Proven performance
Low temperature
Lift-off geometry
Materials flexibility

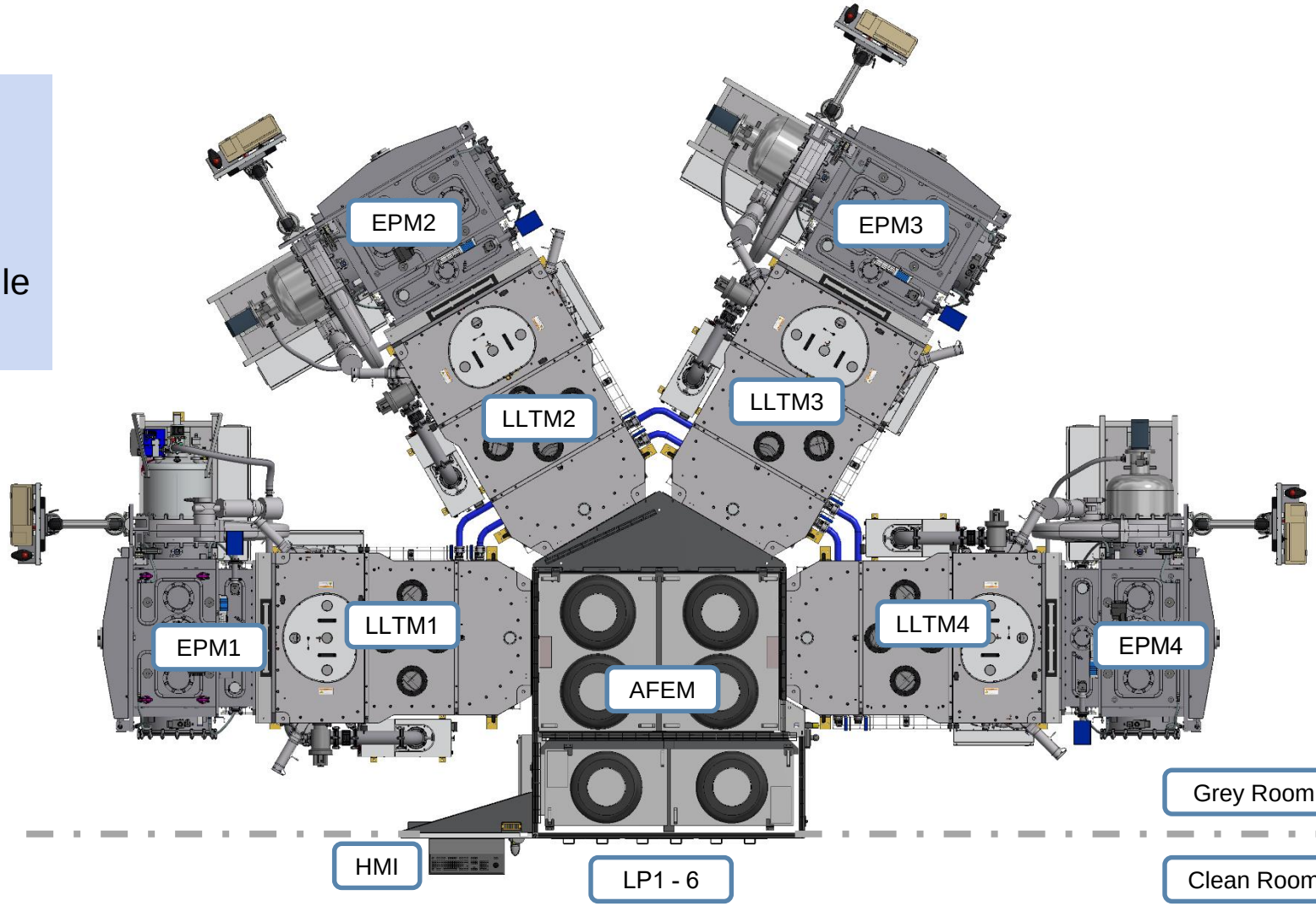
Evaporation Limitations:

Low degree of automation
Long pumping/venting time

Tool components

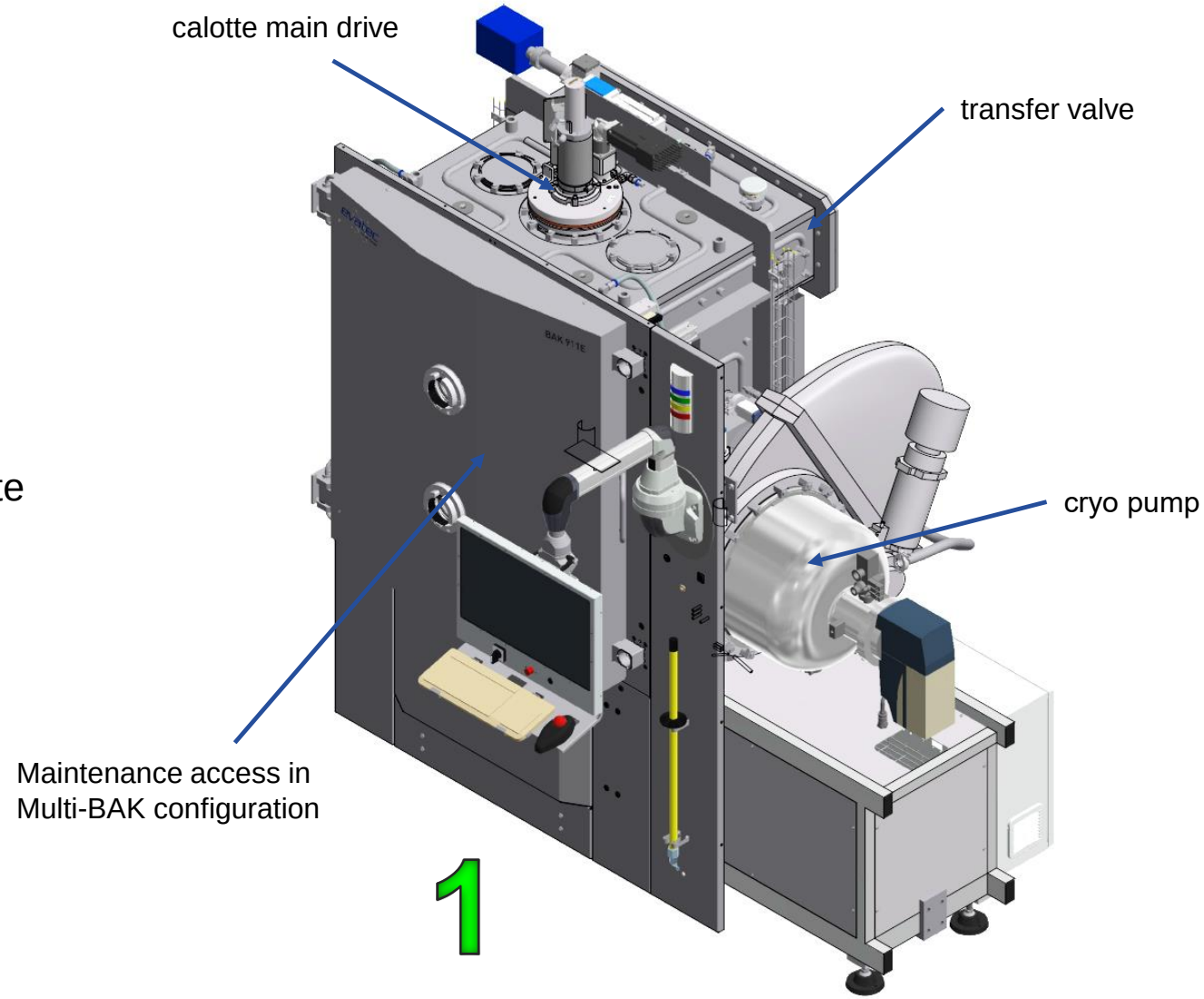
- **E**vaporation **P**rocess **M**odule
- **L**oad **L**ock **T**ransfer **M**odule
- **A**tmospheric **F**ront **E**nd **M**odule
- **L**oad **P**orts (atmospheric)

4x1= > 4

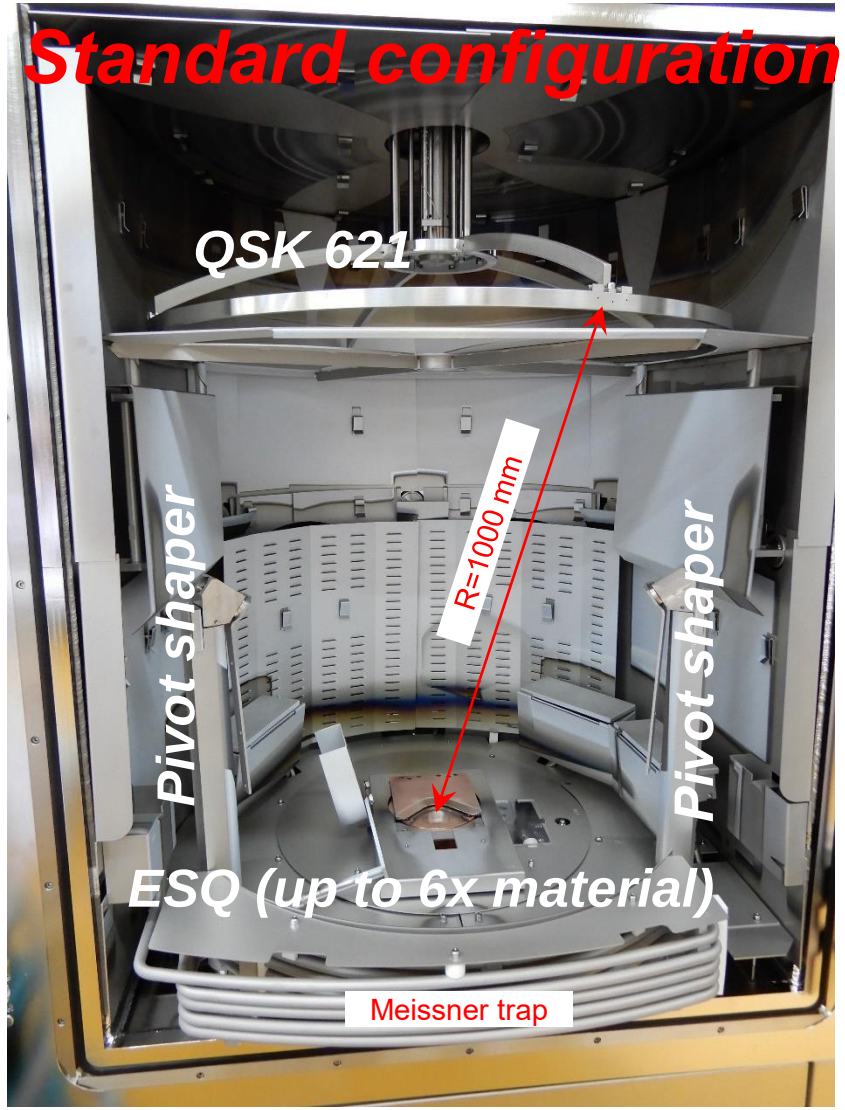


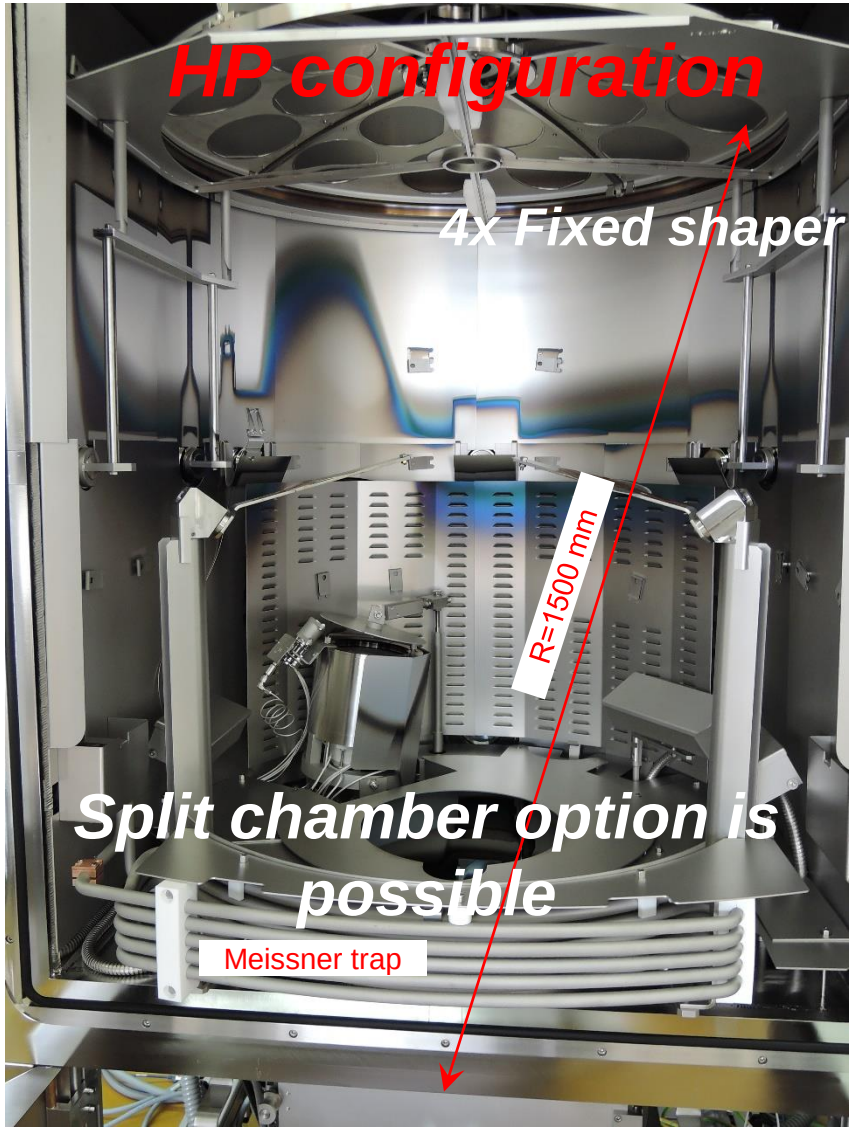
Characteristics

- With 1 cryo pump and optional Meissner
- VAT transfer valve for calotte segment transfer between process chamber and Load lock transfer module LLTM
- SPS control system with PTO software (BAK E)
- Enhanced calotte main drive for very precise calotte rotation/positioning
- Easy maintenance access in grey room
- Automated source material feeding



EPM DESIGN IS BASED ON EXISTING BAK 901 TOOLS

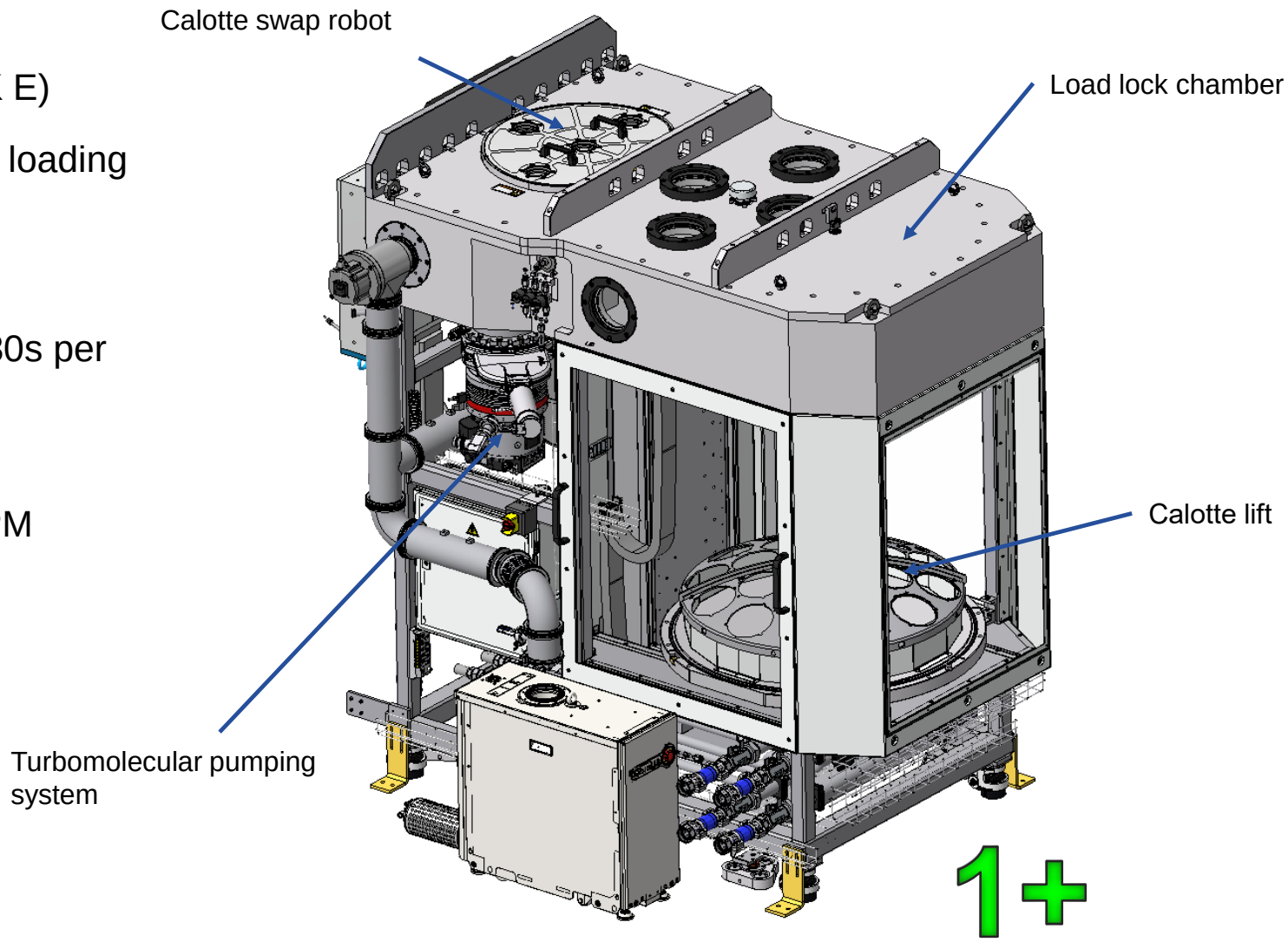




Characteristics

- SPS control system with PTO software (BAK E)
- Calotte lift for automated, atmospheric wafer loading or ergonomic manual loading
- Calotte lift travel time 2 min
- Swap robot to exchange calotte segments (30s per segment swap → 2 min)

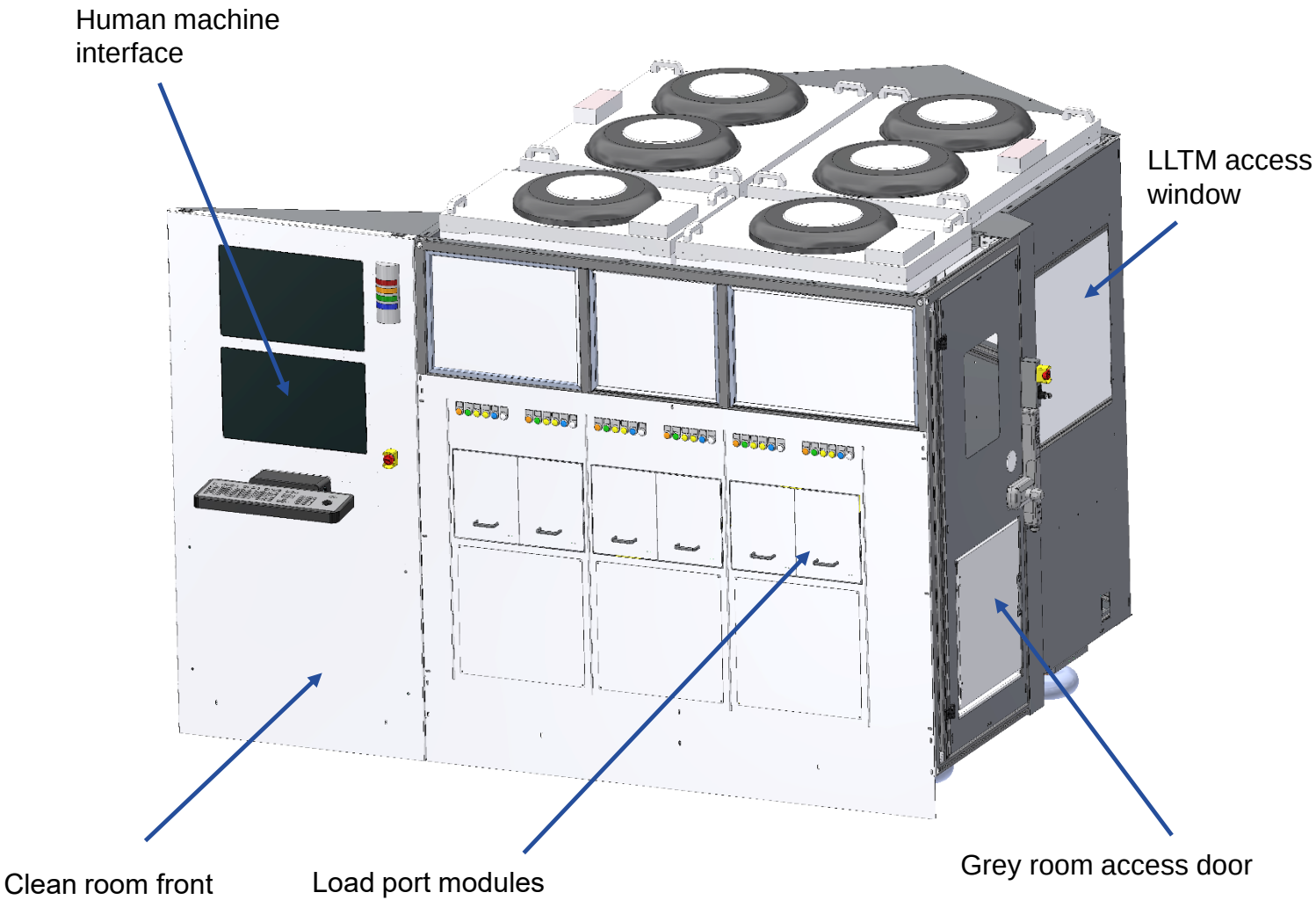
- Pumping time before segment transfer to EPM ($p < 1.0*10^{-5}$ mbar) is < 25 min
- Base pressure < $1.0*10^{-6}$ mbar
- LLTM venting time < 2 min



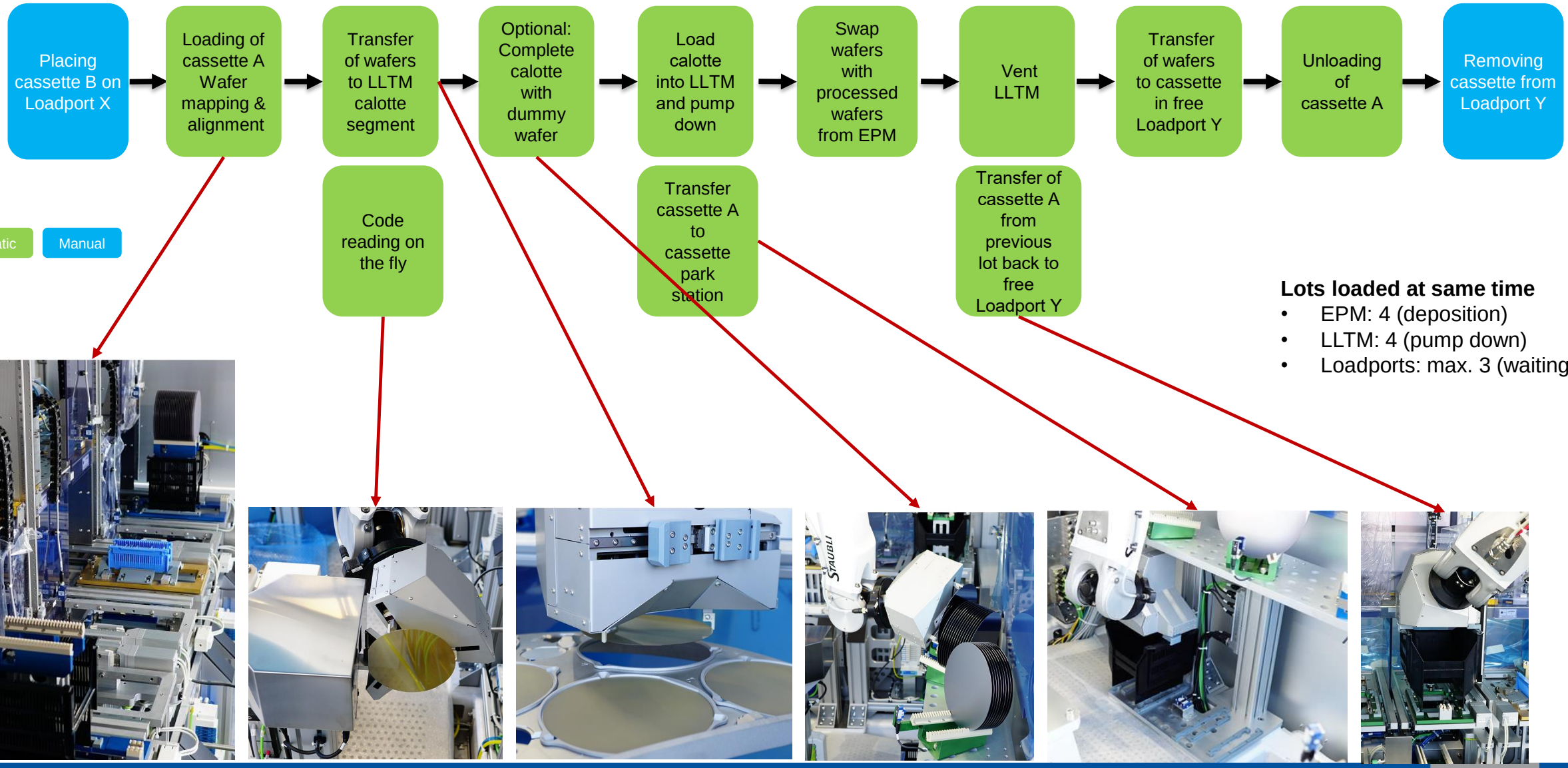
Characteristics

- Separate load ports (LP) for production and monitoring wafer
- Handling of 2'', 6'' and 8'' wafer (edge grip)
- Park positions for empty cassettes
- Central robot to place substrates on segments and handle empty cassettes without tool exchange
- Wafer ID reading on the fly
- Camera observation system for robot monitoring
- Automatic recognition of exact segment and wafer position
- Wafer handling in laminar flow box

- Wafer exchange time < 30s per piece (max throughput ~ 120 wafer per hour)



BAK 941E AUTOMATED SYSTEM
Cassette Loading/Unloading Sequence



Lots loaded at same time

- EPM: 4 (deposition)
- LLTM: 4 (pump down)
- Loadports: max. 3 (waiting)

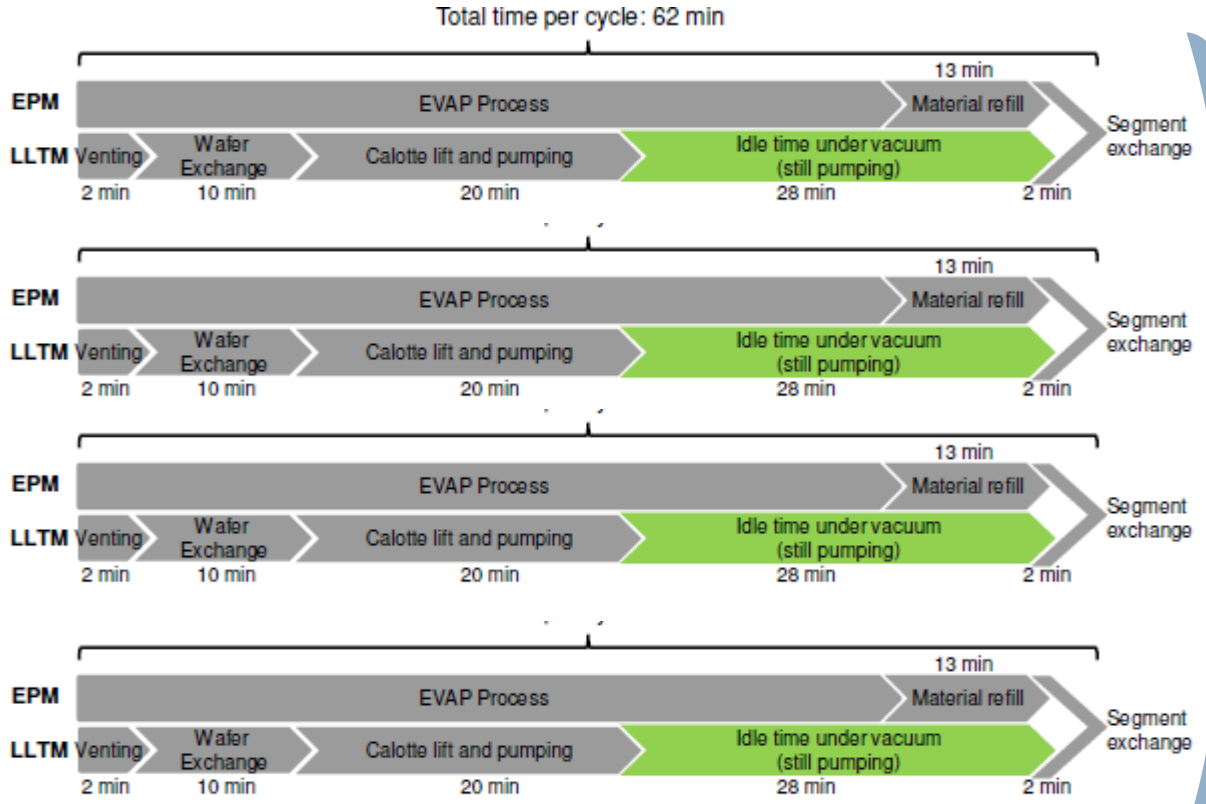
For a typical stack: Ti/Ni/Ag

Manual Evaporator

Total time per process: 97 min

20x6“-> 12.3wph
8x8“-> 4.9wph

BAK 941E



80x6“-> 75.8wph
32x8“-> 30.3wph

4x1=6.2

But that's not all……

…by optimising deposition rates, the choice of source refilling technologies and chamber venting frequency for source refilling / maintenance

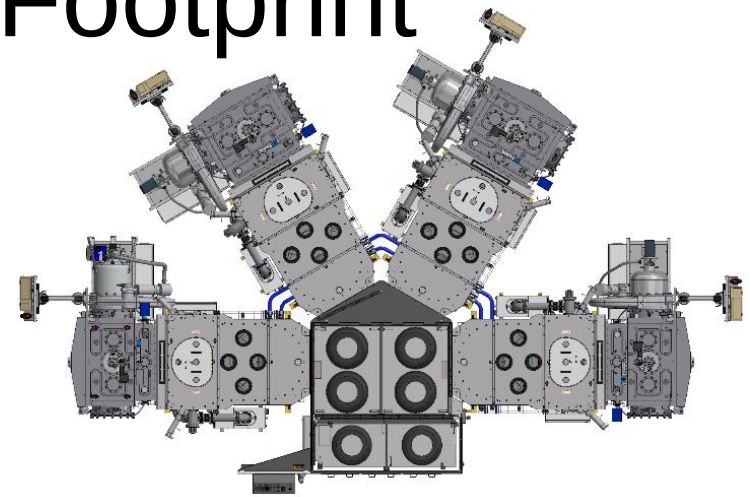
We can show you that 4x1=10

Fixed Costs

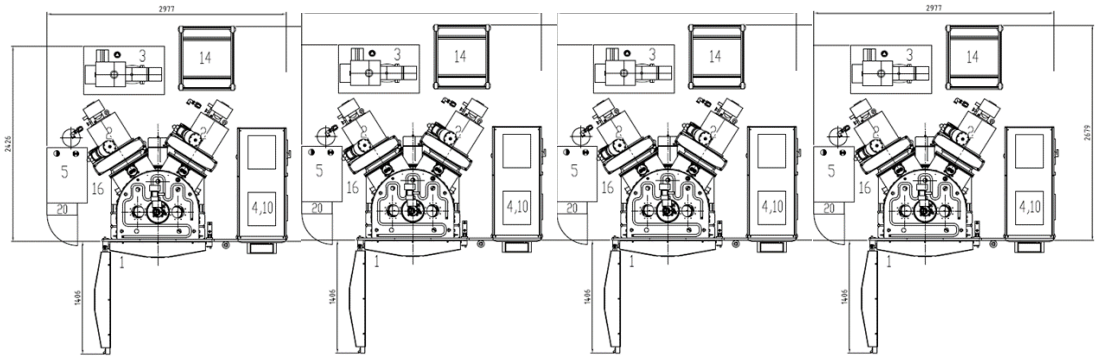
-Tool Investment
-Depreciation
-Footprint

Recurring Costs

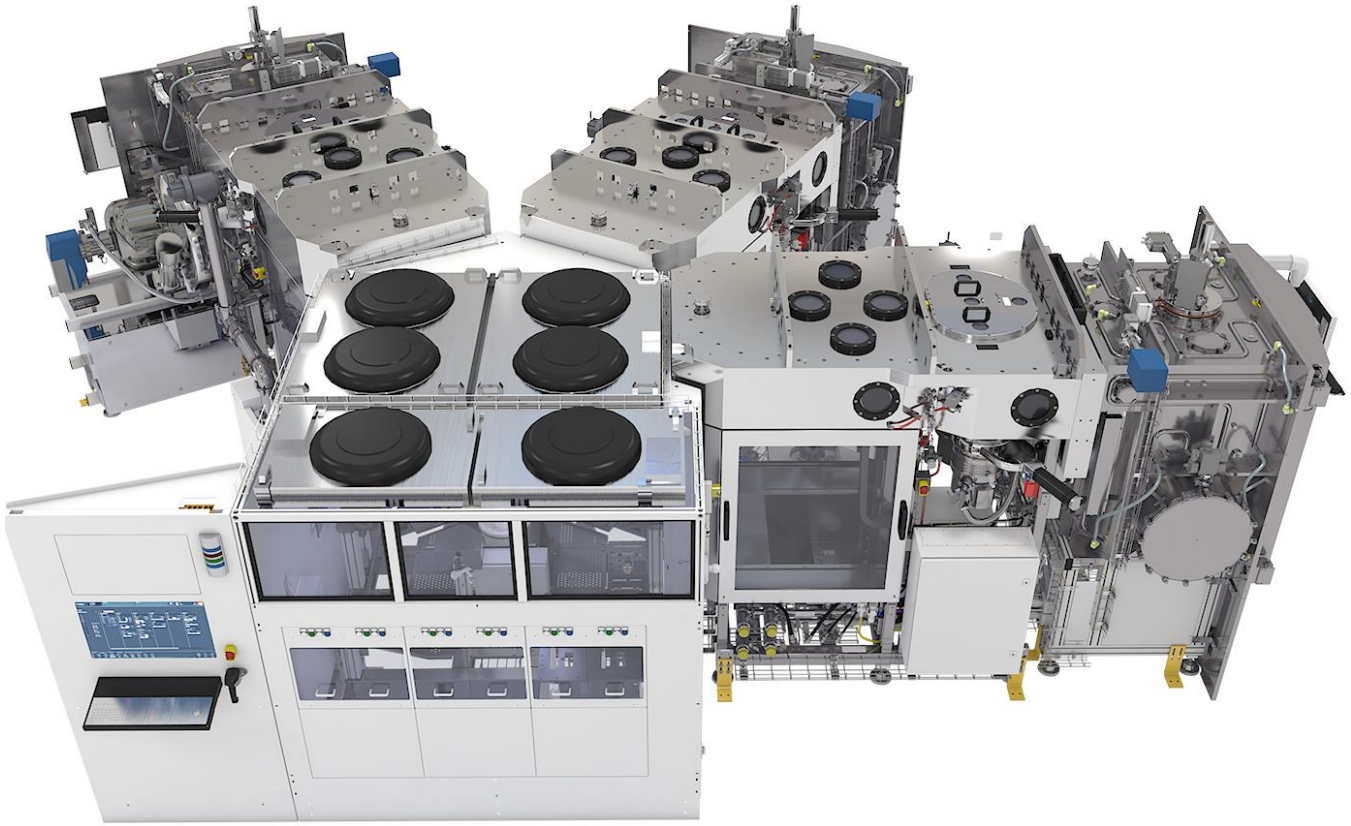
-Manpower
-Maintenance
-Consumables



vs.



Reducing cost of ownership by 15-45%



Process and tool benefits

- Improved vacuum and particle performance
- Automatic substrate handling and tracking
- Flexibility in process module configurations
- Deposition of up to 6 different materials in a single PM
- Advanced operation (auto/manual operation)
- A step change in throughput and reduction in cost of ownership comparing compared with similar single chamber evaporation tools for very high volume manufacturing

Want to know more?

Please visit us in hall B1, booth 630

evatec
process systems

THANK YOU

Want to know more? Please visit us in hall B1, booth 630