

April 2011

**LMS-ASML training program:
A postgraduate program in
Supply Chain Management**

Jazz Huang
(on behalf of James Sun)
ASML

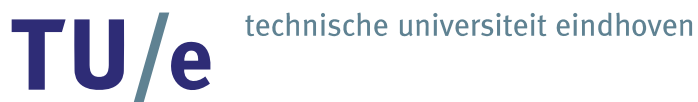
Professor Geert-Jan Houtum
Eindhoven University of Technology (TU/e)

Agenda

- Europe, The Netherlands, Eindhoven
- ASML
- ASML Center of Excellence (ACE)
- Eindhoven University of Technology (TU/e)
- Postgraduate program Logistics Management Systems (LMS)
- Experiences sharing
- Joint LMS-ASML program

Europe, The Netherlands, Eindhoven

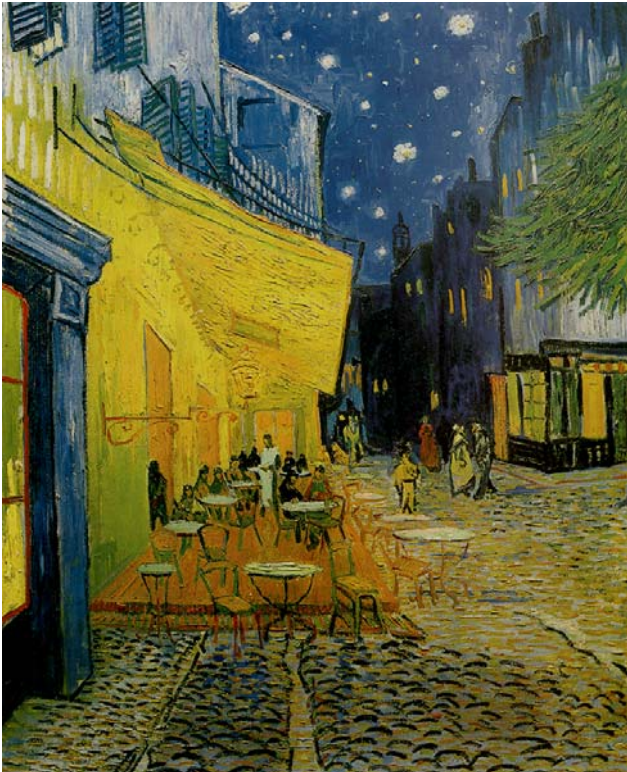
The Netherlands (Holland)





Vincent van Gogh (1853 ~ 1890)

Cafe Terrace at Night



The Starry Night



Rembrandt van Rijn (1606 ~ 1669)

The Nightwatch





The Netherlands

- 16 million people
- Partly below sea level
- Amsterdam:
Financial center
- Rotterdam:
Large harbour
- **Eindhoven:**
High-tech region



Paul the octopus (2008 ~ 2010)



Eindhoven

Known from ...

PSV (Philips Sport Vereniging) Eindhoven.



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Eindhoven

- Number 3 in list most innovative regions in Europe
- Home town of Philips Electronics
- Eindhoven University of Technology
- Many innovative companies:
 - Philips Medical Systems: Top 3 player
 - ASML: Number 1 in semi-conductor lithography machines
 - Vanderlande Industries: Top 3 player in baggage handling systems and sortation systems
 - DAF Trucks: Top 3 player in European truck market
 - FEI: Top 3 player in electron microscopes

ASML

Business Environment

- ASML: designs, integrates, markets and services advanced systems used by customers to create chips (IC)
- Industry: semi-conductor, capital equipment
- Business: B2B, High-Tech
- Close cooperation suppliers, customers, technology partners
- Technology Push: help customers shrinking IC patterns
- Market: highly volatile and cyclical
- Time to market: everything
- Position: from technology leader in past to market & technology leader now

ASML worldwide



Nano Lithography Equipment

Introducing the NXE Platform in 2010



Main Technology

- Mechatronics
- Optics
- Electronics
- Software

Purpose

- Imaging IC patterns on silicon wafer

Capital Equipment

- Average selling price
> EUR 14 mln per system

TWINSKAN NXE:3100 & NXE:3300B

ASML Center of Excellence (ACE)

ASML Worldwide Center of Excellence

Objectives

- Closer proximity to Asia customers
- Acceleration of technology advancement
- Attract and retain Asian talent
- Asian sourcing of modules, components, and services
- Provide potential nucleus for future ASML growth initiatives

Vision

An innovative, forward-looking ASML organization providing worldwide resources in new technology development, process methodology, and talent incubation



ACE 2010 KPIs and contribution to ASML

Five major centers KPIs 2010

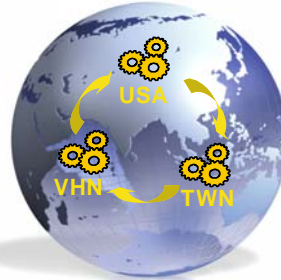
Global Training		Asia Sourcing		Global Tech Support Global Distribut'n Ctr		Global 200mm		Applications Development	
Volume training weeks	Revenue	Volume	Move rate security	GSC Asia solving capa	1st & 2nd line solving power	Fasy/Test /PE readiness	Infra readiness	YS tool box & YS Focus	Baseliner Eclipse
XT4/NXT NPI-> volume	Quality	XT4/NXT body 5%→10%	Supplier performance	NXT readiness	Downtime waiting for parts (DTWP)	Assy transfer	Engr'ing transfer	On-Product Overlay	Flexray applications



Global volume training center up to immersion



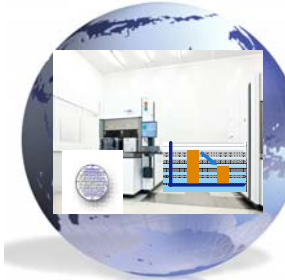
Sourcing for XT4 and NXT on the main body



Global 7 x 24 on technical escalation and urgent parts support center



200mm system refurbishment center



Applications co-development in customer proximity focusing on-product performance, Baselier and YS

Eindhoven University of Technology (TU/e)

*Professor Geert-Jan Houtum
Eindhoven University of Technology (TU/e)*





TU/e has a high reputation!

*TU/e ranked as number 3 in Europe
in a study of the European Union
behind the Universities of Cambridge and Oxford*

TU/e ranks consistently high in comparative studies

Who is

TU/e

Technische Universiteit
Eindhoven
University of Technology



Where innovation starts

Eindhoven University of Technology

The TU/e profiles itself as a leading international university specializing in engineering science & technology, contributing through excellent teaching and research to progress in the technical sciences, to the development of technological innovations and as a result to the growth of welfare and well being, both within its own region (technology & innovation hotspot Eindhoven) and beyond it.

In brief, the TU/e profiles itself as the university Where Innovation Starts.

TU/e technische universiteit eindhoven

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ASML

Some statistics

- Established 1956
- Engineering school
- 12 bachelor programs in engineering
- 25 master programs, all taught in English
 - Among which *Operations Management and Logistics*
- 10 postgraduate programs
 - Among which *Logistics Management Systems*
- 20 PhD programs

Some further statistics

- 220 professors
- 800 other academic staff
- 800 PhD students
- 200 students in postgraduate programs
- 2500 master students
- 4500 bachelor students
- 100 student associations

Many employees and students from abroad!

Postgraduate program Logistics Management Systems (LMS)

LMS overview

3TU.School for Technological Design

STAN ACKERMANS INSTITUTE



Location: TU Eindhoven
The logistics and management of complex industrial processes require insight in planning, organizing and controlling the flow of goods from raw material to end user, and logistic aspects of workflow management. The LMS program is designed to broaden, increase and integrate knowledge and skills in the field of logistics.
The program pays considerable attention to designing, building, testing and implementing complex logistics management systems.

Logistics Management Systems

3TU

Through more intensive cooperation, the three universities of technology in the Netherlands enlarge their impact on the field of the Dutch knowledge based economy.

TU Delft

TU/e Technische Universiteit Eindhoven University of Technology

UNIVERSITY OF TWENTE.

TU/e technische universiteit eindhoven

Slide 26 |



ASML

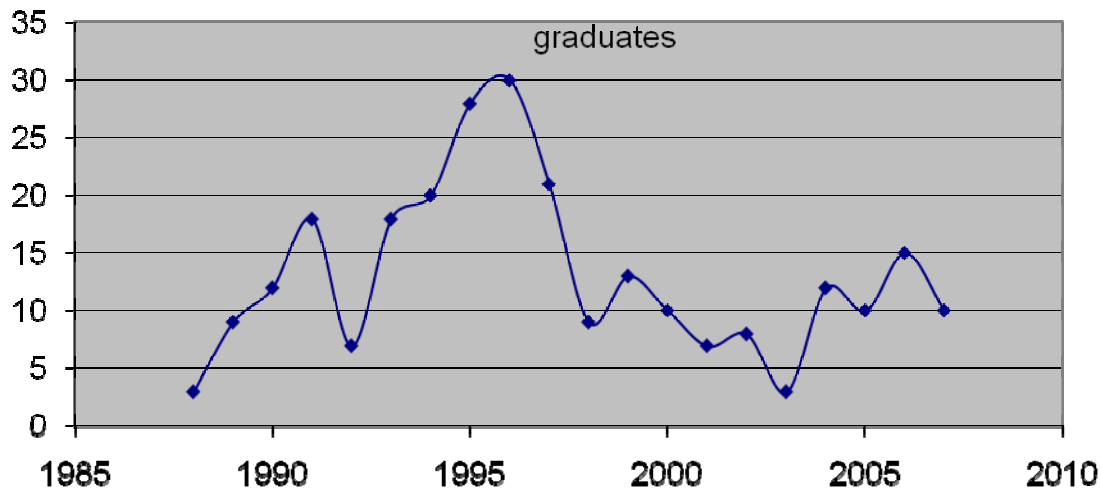
LMS in short

LMS is:

- a 2-year post Master program
- aims at planning and control of supply chain processes
- an international program
- includes practical training
- to become logistics designer (superengineer)
- employed by Dept. Industrial Engineering

History

- Started in 1986 when TBdk program was reduced from 5 to 4 years, requested by companies
- Originally all courses in Dutch (Log. Besturing Systemen), since 2000 in English (Log. Man. Systems)
- About 300 graduates, organised in VLO (Vereniging Logistieke Ontwerpers), with several annual meetings

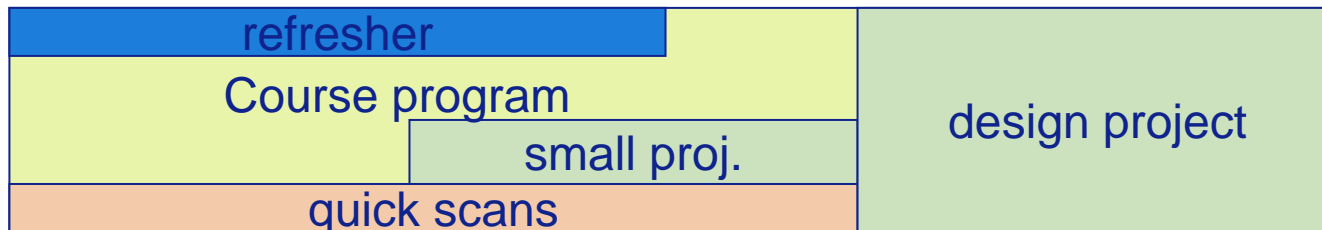


who and when?

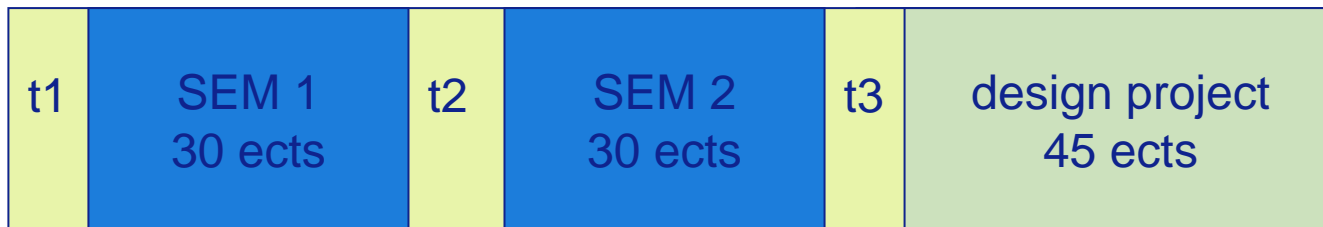
- students with a technical Master, preferably with logistics knowledge (**Ind. Eng.**)
- good grades, IELTS test/ TOEFL test, perhaps GRE test, recommendation letters
- mix of different countries
- selection on basis of (expected) design project
- selection by LMS and company
- starting twice a year (February/September)
- some refreshing can be done in advance

Program

- Refresher spread over 12 months, using Pre-MSc and MSc- courses
- QS or small project in 'own' company in first year
- Flexible Course Program with MSc-courses and specific LMS courses
- Longer designproject (9 months)



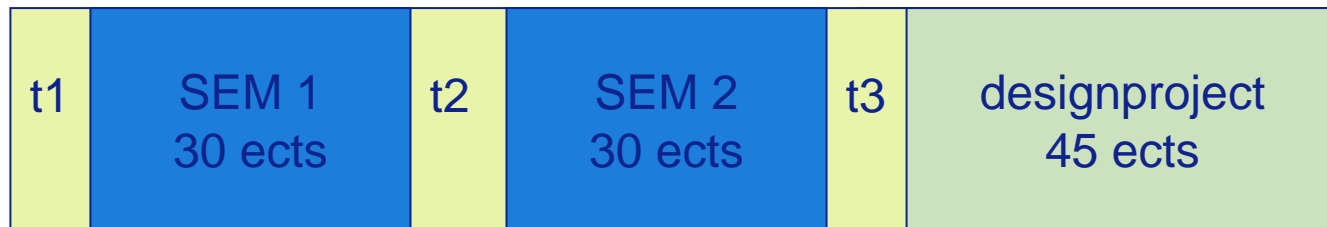
fitting in semesters with 3 intermediate blocks



Program choices

- Refresher mostly in t1 and SEM1, using Pre-MSc and MSc-courses
- Design project (45 ECTS)
- 45 ECTS specific LMS courses
- 30 ECTS OML courses, some with additional elements
- t1, t2, t3 will be used flexible around summer and winterholidays (total 44 weeks per year)

fitting in semesters; total 120 ECTS



Program-elements

- Mathematics
- Operations Management (many OML parts, but also Warehousing and Distribution)
- Information Technology
- Some Economics, Marketing & Purchasing
- Quick Scans (company group projects)
- Design Project (and perhaps also small project in own company)

Program

ABC blok	1CM15	PPM	5		DEF	1CM05	DOPCS	5	
	1CM40	Retail	5			1CM25	SCOP	5	
	1CM05	DOPCS	5			1CM30	Service SC	5	
		EBAS	5			1ZM35	Strategic Sourcing	5	
	1ZP04	Marketing & Purch. Mar	3	8--10		1BM55	EIS	5	
	1CM10	MAMS	5	5		1CM20	Man. Acc	5	10--15
	LMS	QS1	5	5		LMS	QS2	5	5
	LMS	Logistics in Branches	3	3		LMS	Log Branches	3	3
	LMS	Simulation	3	3		LMS	Discrete Models	3	3
	LMS	Data Object Modelling	2	2		LMS	PD	2	2
	LMS	PD	2	2		LMS	System Dynamics	2	2
	LMS	Des. Warehouse	3	3		LMS	Design of Distributi	3	3
	LMS	Logistics Refresh	5	5		LMS	TWE	3	3
	LMS	Stoch Models	3	3		LMS	Refresh	5	
		EXTRA REFRESH							
	2DD21	Pre-M.. OP.RES.	3						
	1CP06	Bus. Economics	3						
	1CP05	Log. OML	6						

LMS compared to Master program

Program	Operations Management and Logistics	Logistics Management Systems
Leads to	M.Sc. degree	Professional Doctorate in Engineering (PDEng) “superengineer”
Entrance level	B.Sc. degree	M.Sc. degree; only excellent young graduates are being accepted
Tuition?	Yes; scholarships available	No; you will be an employee and receive a salary
Number of entrants per year	60-70	8-15

LMS is supported by contract research

- ASML
- Philips Medical Systems
- Philips Lighting
- Philips Semiconductors
- KLM
- FEI
- Océ Technologies
- Fokker Services
- Akzo Nobel
- Amgen
- Nike
- Dow Chemicals
- Proctor & Gamble
- Unilever
- Bausch & Lomb
- DHL
- Exel Logistics
- Assembleon
- Netherlands Railways
- DSM

Master's program Operations Management and Logistics (OML)

OML in short

Entrance level: Bach. degree in IE or related program

Focus: Analysis and design of operational processes
in manufacturing, service, and non-profit industries

Length: 2 years

Language: English

Tuition: Appr. 18,000 Euro for the whole program

Number of entering students per year: Appr. 60

Limited number of scholarships available!

Contributing areas

- Operations Planning and Control
- Information Systems
- Management Accounting
- Reliability and Maintenance
- Human Performance Management

General structure of the program

1st semester:

- Compulsary courses

2nd semester:

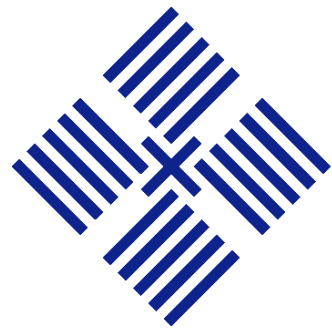
- Restricted elective courses (to be approved by mentor)
- Free elective courses

3rd semester:

- More elective courses
- Preparation of the master thesis

4th semester:

- Master thesis project, possibly within a company



ASML

Experience Sharing

Denise Chen

Confidential

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<author>

Agenda

- Life in LMS ,TU/e and The Netherlands
- Working experience in ASML

Life in LMS

- What can you do?
 - Theoretical courses
 - Practical courses
 - Professional development courses
 - Project
- What's the fun part of LMS?
 - International dinner
 - BBQ
 - Sinterklaas



Life in TU/e

- Who can you meet?
 - From LMS
 - From VLO
 - From your surroundings



Life in the Netherlands

- How to kill time?



Work in ASML (Veldhoven)



TWINSCAN NXE:3100 & NXE:3300B

- Average selling price > 14 million euros per system
- NXE price is up to 50 million euros

GLS service part planning



- **50+** WW warehouse
- Installed base of **3,000+** systems
- How to minimize system down time by optimal inventory planning?

Working in ASML

- A place to provide challenges
 - Bring theory to practice
 - React to fast changes
 - Work in an international environment
 - ... more challenges
 - Develop yourself!!
- Contact Information:
denise.chen@asml.com

Q & A

Thanks for your attention!!





ASML

Experience sharing

Jazz Huang

Confidential

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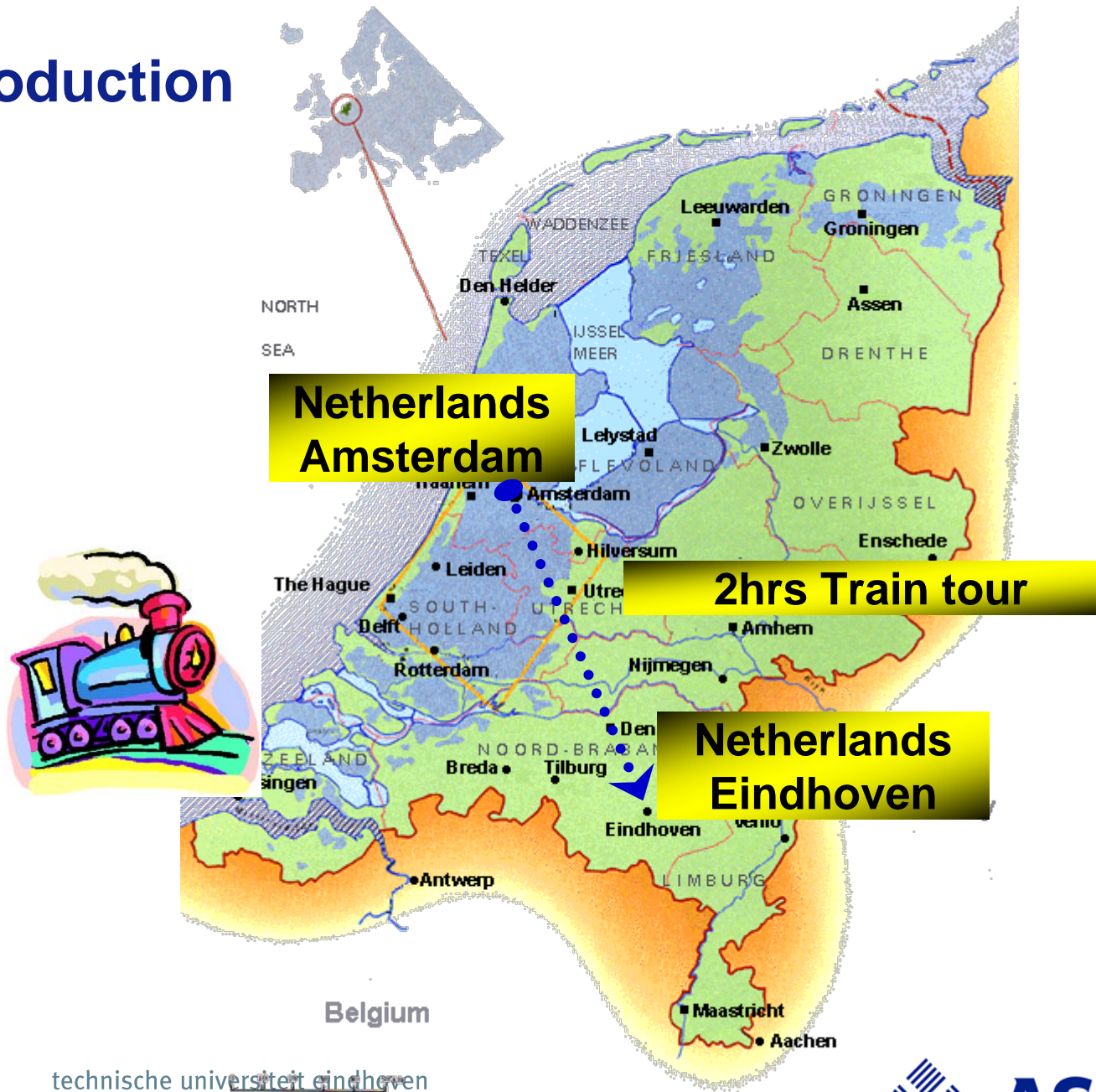
The story is about.....

- Introduction
- Student life during 2 years LMS study
- Experience in ASML project study
- Working experience in ASML, ACE (Linkou林口)

Introduction – geographic location



Introduction



Study in ASML/LMS program

(2 years program = 2 years of work experience in ASML!!)

16 Months

8 Months

Phase 1

Phase 2

Follow LMS courses
in TU/e

Logistics Design
Project in ASML

Continue working
in ASML (NL or TW)

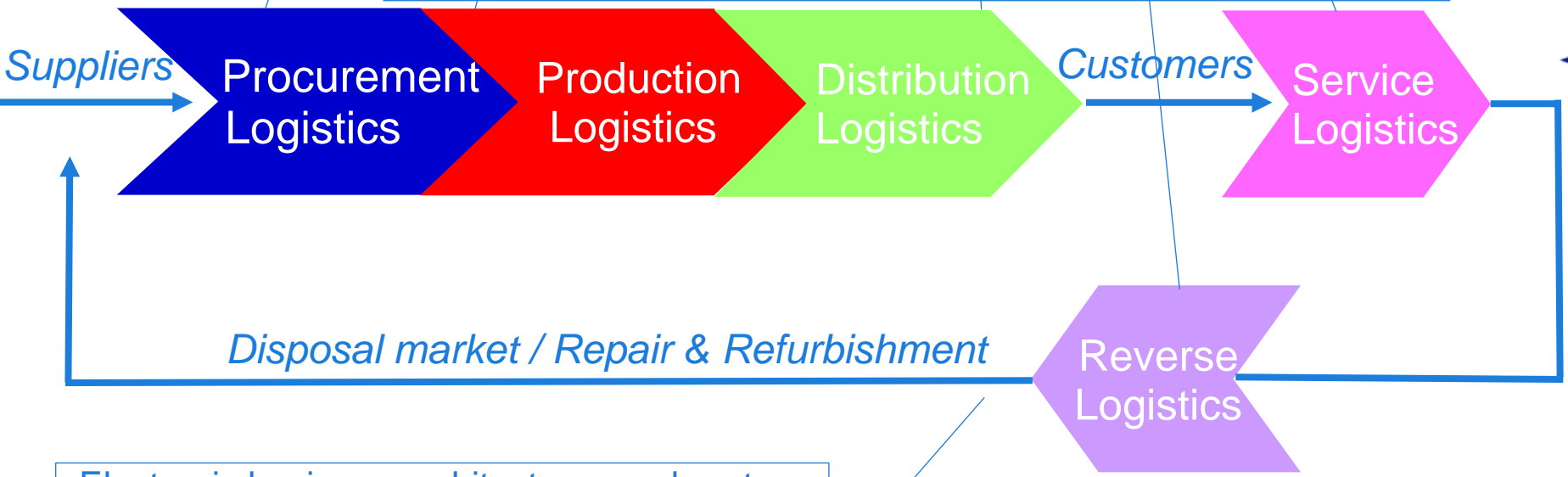
Sep-2011

Jan-2013

Sep-2013

Logistics Management System?

- Design of distribution systems
- Designing warehouse processes
- Retail operations
- Marketing and purchasing management
- Modeling and analysis of manufacturing systems
- Strategic supply chain management for capital goods
- Game theory with applications to supply chain management
- Supply chain operations planning
- Management accounting



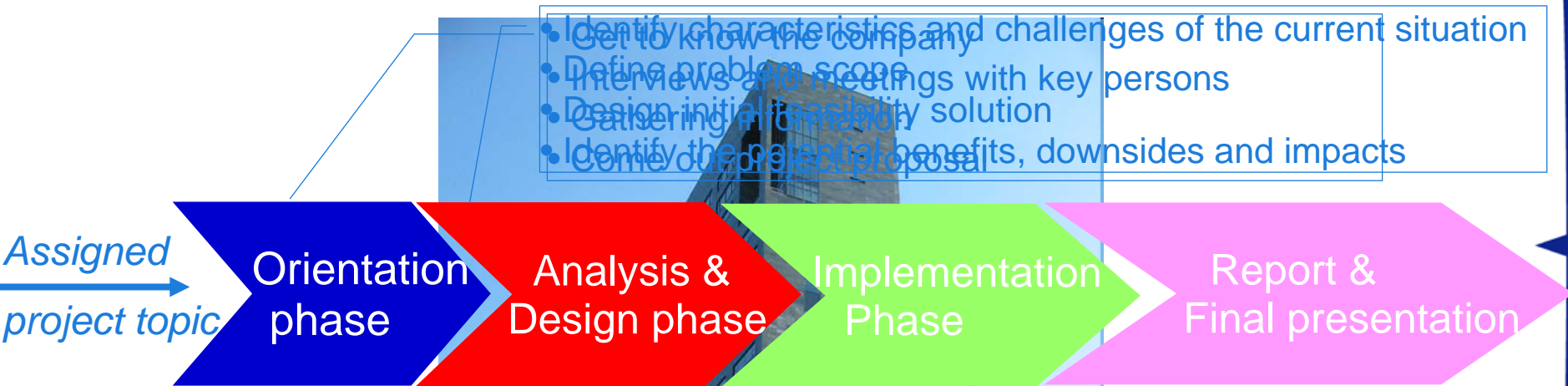
- Electronic business architectures and systems
- System dynamics
- Simulation for logistics
- Data and object modeling
- Discrete models for design and planning
- Stochastic models for design and planning
- Inventory control

Quick Scan Project

LMS experience

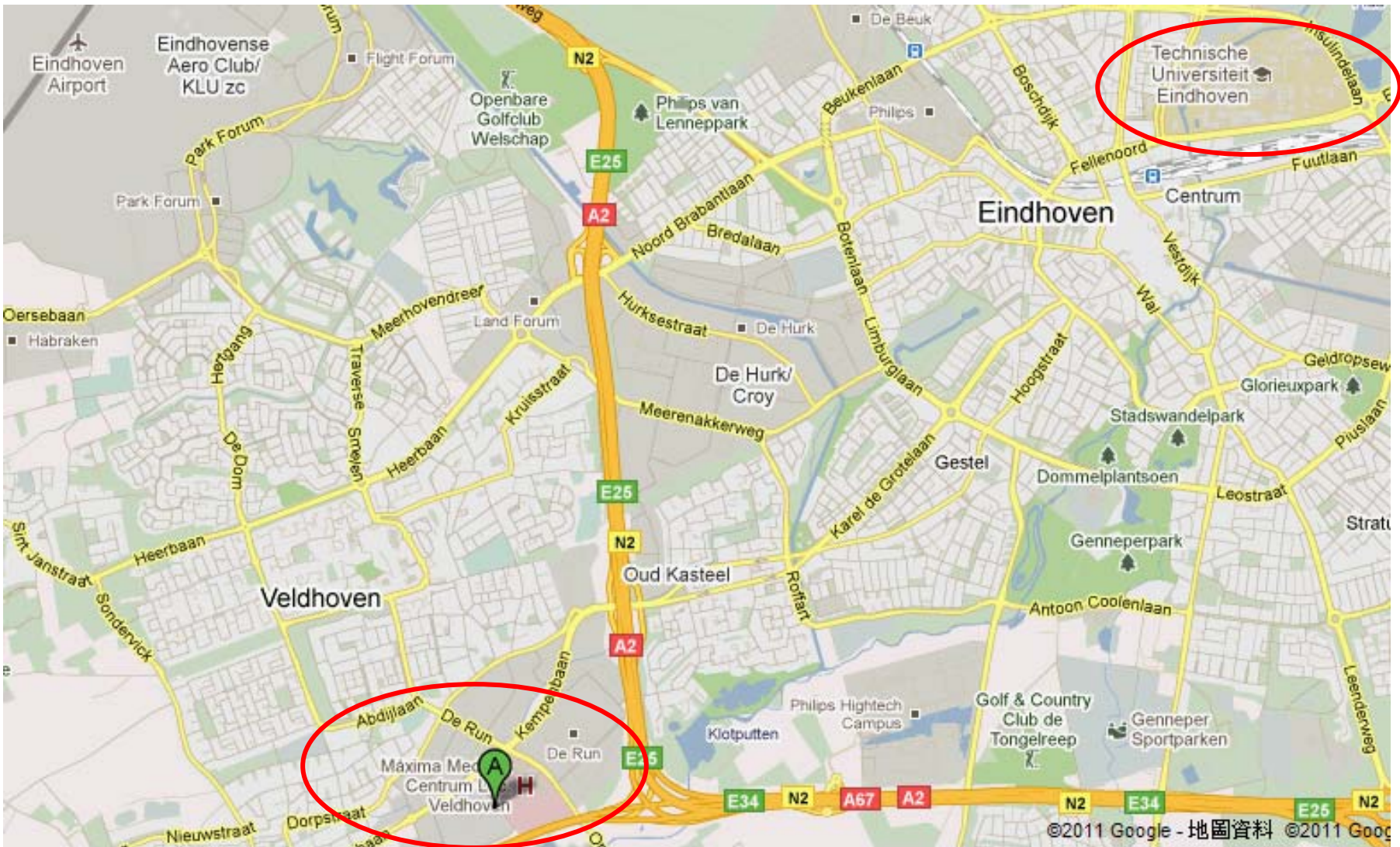
- **International:** students from different countries in worldwide e.g. US, China, Russia, Brazil, Argentina, Malaysia, Poland, Greece, Turkey etc.
- **Communication:** learning how to communicate with people from different countries.
- **Group assignment:** co-work with your international colleagues.
- **Workload:** always working hard on assignment and project.
- ***Enjoy your time in LMS international program!!***

Design project in ASML, Veldhoven



ASML HeadQuarter – Veldhoven, Netherlands





Project experience

- Project management: *YOU are the project leader!*
- Communications
- Dutch company culture (way of working)
- ***Enjoy your time and make it happen!!***

Besides *Study & Project*...what else?



ASML

Why traveling?

- 學習工作規劃 Learning how to make work plan!
- 累積人生經驗 Gain life experience!
- 冒險犯難精神 Explore adventurous spirit!
- 拓展自我見識 Develop self-knowledge!
- 認識自己 Position yourself!
- FUN loh~~

Work in ASML, ACE (Linkou林口)



Global Logistics Service – Material Planning

- **Material Planning:** Plan and control WW Global Distribution Center / local inventory of service parts based on historical data, supply chain condition and/or projected requirements. Integral supply chain to match demand and supply.
- **Inventory Control:** Control inventory levels of central / local service parts inventory; ensure proper reporting in order to monitor the inventory levels and other key figures. Advise on required actions to improve inventory levels.
- **WW Replenishment:** Plan and control production orders to keep central/local inventory on adequate level.
- **Communication and Reporting:** Ensure adequate information exchange between demand and supply. Initiate corrective and preventive actions.

Global Logistics Service – Material Planning (cont.)

- **Expediting:** To purchase and expedite all production materials to meet established production schedules and customer service demand.
- **Inventory Control:** Work closely with production planning and global distribution center (GDC) in inventory control processes and procedures.
- **Supply Planning:** Manage supplier performance together with procurement and supply chain department to evaluate processes regarding to delivery and services.
- **Communication:** Interact with production/shipping/receiving departments and accounting department to confirm, advise and problem solving with any issues in relation to purchasing and delivery.

STUDY in Holland!

The Gate to Success!



Thanks for Your Attention!



Jazz.Huang@asml.com

Joint LMS-ASML program

Jazz Huang
(on behalf of James Sun)
ASML

Refresher – The Generation of LMS-ASML program

- **1st Generation (2007-2009)**

- Denise Chen (陳秋玲) => working in ACE, TW
- Jazz Huang (黃俊嘉) => working in ACE, TW
- Lionel Yang (楊博鈞) => working in Veldhoven, NL

- **2nd Generation (2011/Jan-2013)**

- Simon Chen (陳信宏) => studying in TU/e
- Liya Wang (王麗雅) => studying in TU/e
- Iris Chang (張家瑜) => studying in TU/e

Joint LMS-ASML program in short

- For excellent Taiwanese students with a master degree in IE or a related field (students belonging to the top 5-10%)
- Students follow the LMS program and do their company projects at ASML
- ASML wants to recruit their future *high potentials* via this program

General structure of the 2-year program

- *Each student is coupled to ASML from the beginning*
- LMS specific courses
- Extended master courses
- 1 or 2 small projects at ASML
- 1 large final project of 9 months at ASML

Each student gets a tailor-made program!

What is the offer?

- You become an employee of TU/e for 2 years, starting on **September 1, 2011**
- Your salary is more than sufficient to cover your living expenses (**recall: there is no tuition**)
- Work permit is arranged by TU/e
- TU/e helps with housing (**guaranteed for 1st year**)
- You sign a contract that states that you work for **at least 3 years** at ASML after the completion of the LMS program (**escapes possible**)

How to apply?

- Make your application package (in English):
 - Letter, with a motivation of why you apply
 - Curriculum Vitae
 - Copies of diplomes and other official transcripts
 - If available, results of a GRE or IELTS/TOEFL test
 - If possible, a recommendation letter of your master thesis supervisor
 - Other documents that indicate your quality, e.g., a recommendation letter

How to apply?

- Send your package to ACE Logistics Manager:
james.sun@asml.com
- For questions:
 - James Sun, james.sun@asml.com
 - Jazz Huang, jazz.huang@asml.com
 - or call +886 3 270 8699
- Deadline: **May 13, 2011**

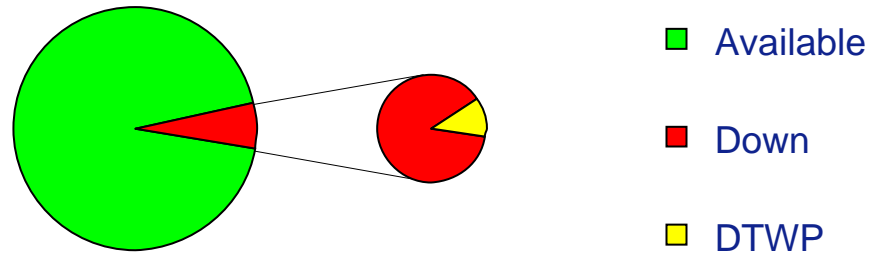
Interviews with selected candidates will be scheduled
on **May 23~27, 2011** at ASML Linkou office (林口)

Questions?

Back up slides

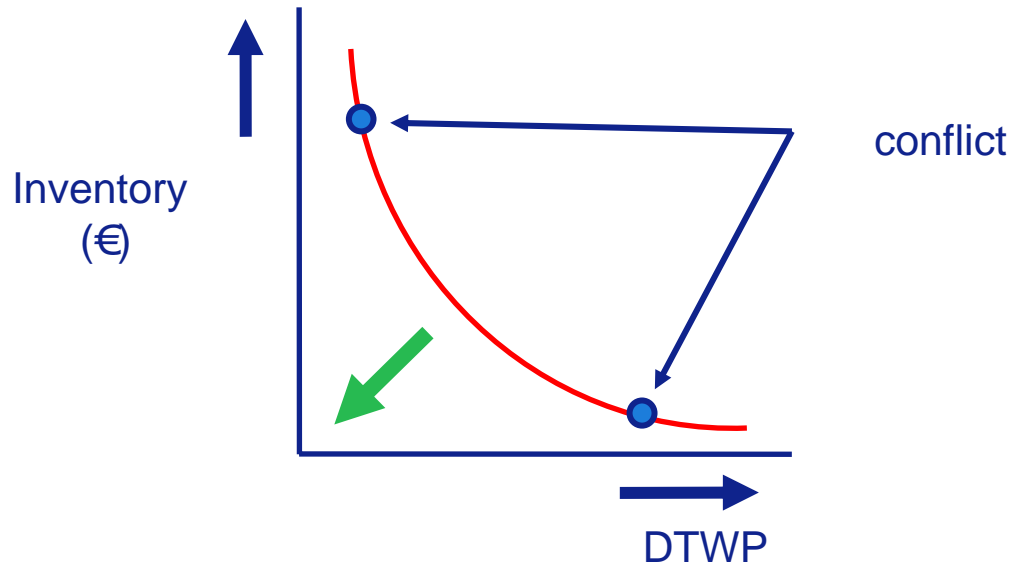
Machine downtime budget

Equipment Availability



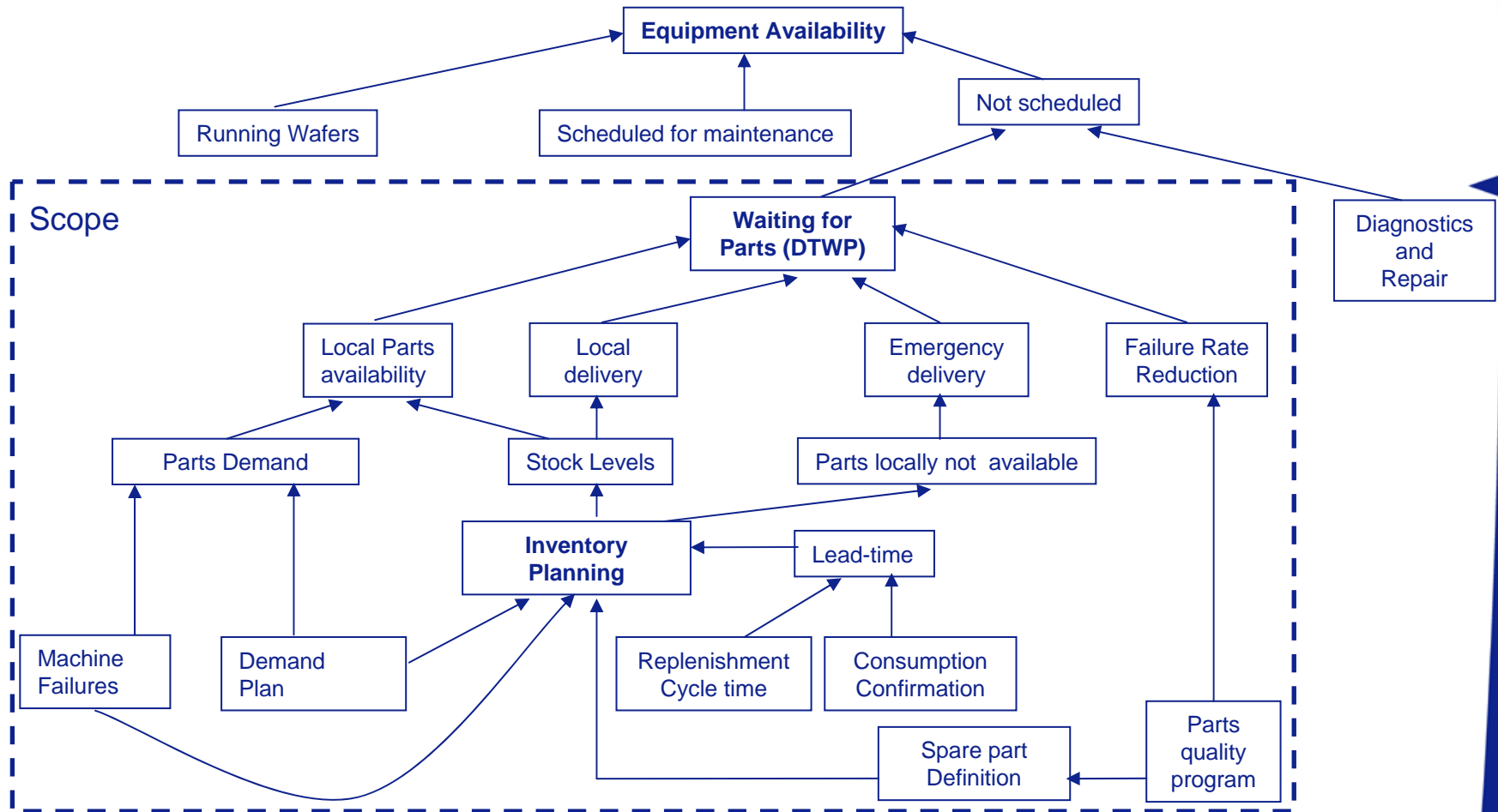
- Down Time Waiting Parts (DTWP): the fraction of time equipment is waiting for a service part
- DTWP management was introduced at ASML to align spare parts inventory planning with semiconductor industry needs

DTWP & Inventory

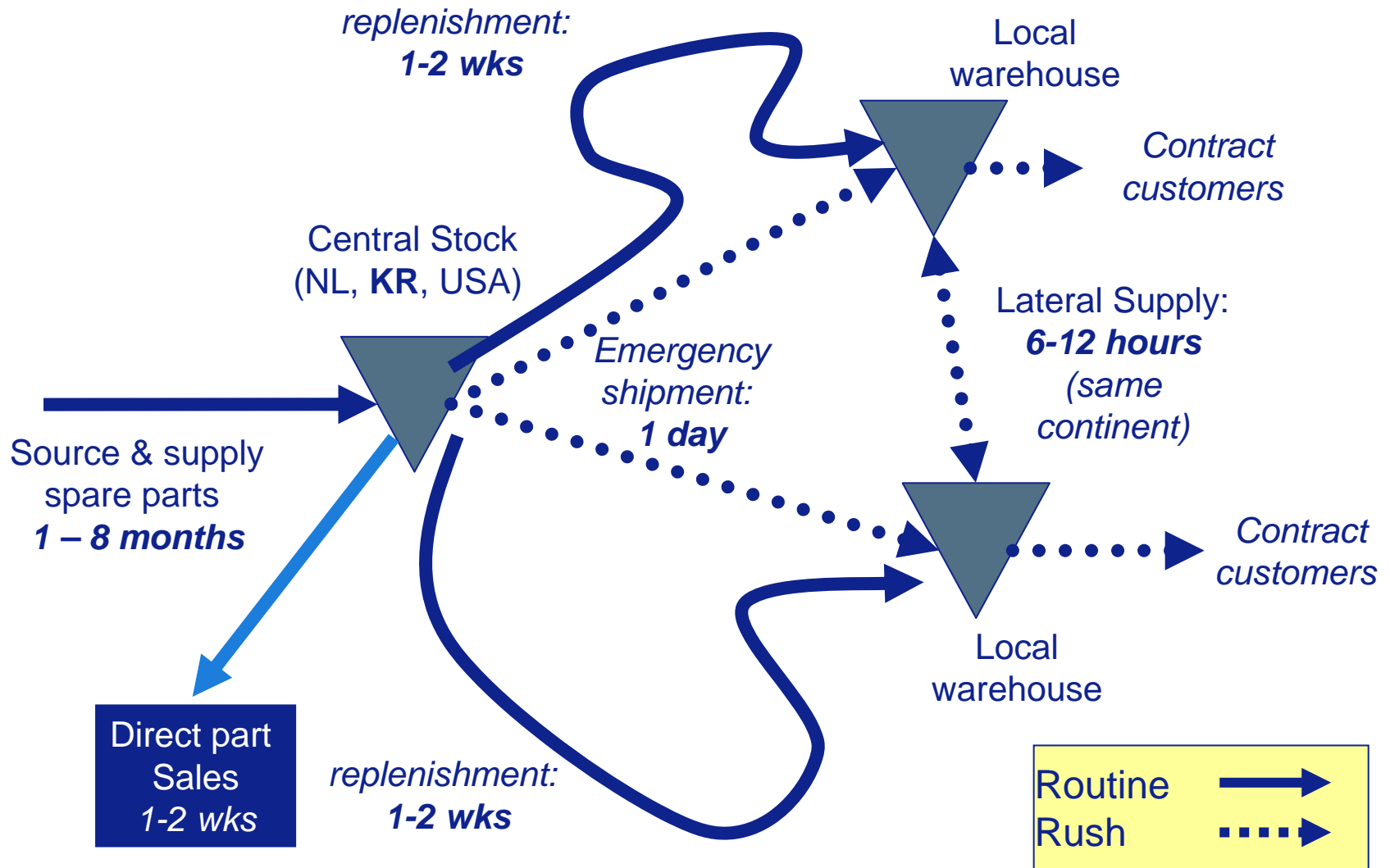


- Basic relationship DTWP and inventory; decrease DTWP by increasing inventory
- Customers require lower DTWP; ASML prefers to reduce inventory → possible conflict?!
- Solution: push the curve down! But how?

Equipment Availability & Logistics scope



ASML Supply chain model



Key figures ASML Service Parts

• demand per week	1.000
• WW stocking locations	65
• # parts (SKU)	10.000
• # service tools (SKU)	3.000
• part (re)designs PA	400
• part price (€)	20 – 1.000.000
• Part failure rate	2 ~ 30 yrs!

Inventory Planning

- based on mathematical models
- Quarterly review

Input Planning Model

- WW failure data
- Configurations of all installed equipments
- Service Level Agreement
- Cost parameters

ERP System

- SAP, highly customized