

# NOMAD Project



# NOMAD Project

- European Commission Framework 5 Growth Program
- Duration: 42 Months
- Partners: 8
- Budget: 4.8 € Million
  - 50% Partner Contribution
  - 50% European Commission Contribution





**TWI**  
Cambridge, England




**ESAB**  
Goteborg, Sweden



Espoo, Finland  
**DELFOI**



**NUSTEEL**  
Lympne, England



Magdeburg, Germany  
**IFF**



*(Programme Managers)*  
**CATERPILLAR**  
Gosselies, Belgium



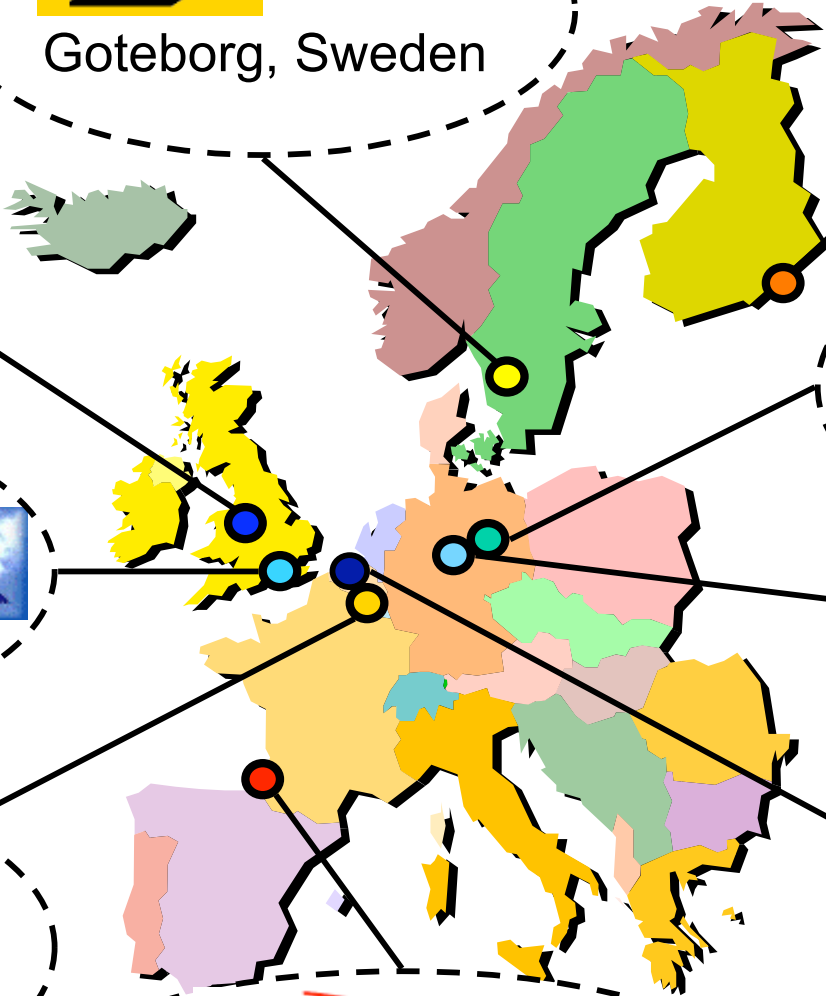
Obernburg, Germany  
**REIS ROBOTICS**



**ROBOSOFT**  
Service Robotics  
Biarritz, France



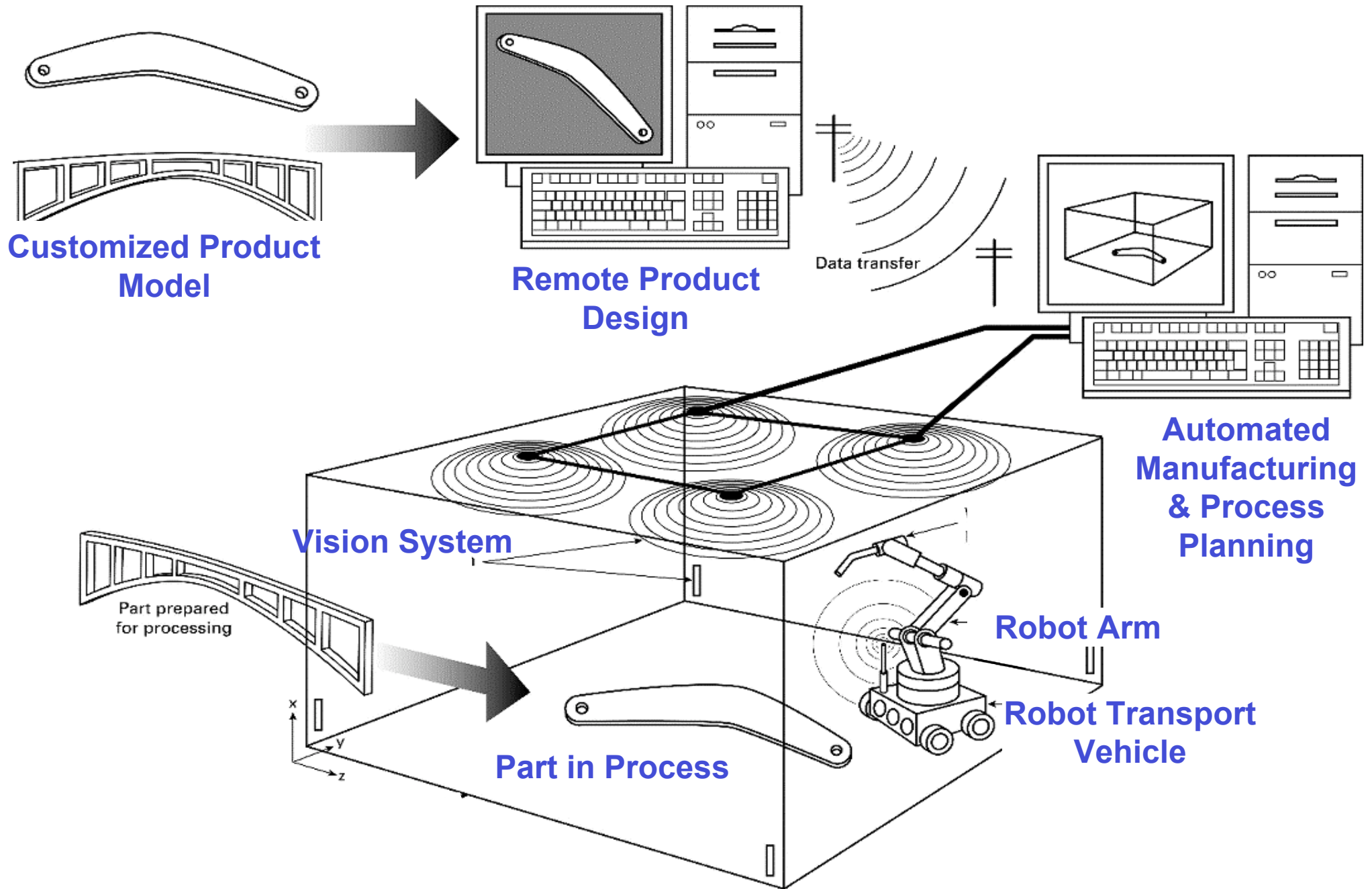
**European Commission**  
Brussels, Belgium



# Goal

- To produce a fabrication cell in which customized structures can be welded as efficiently as a large volume production cell of today by using autonomous robot technology



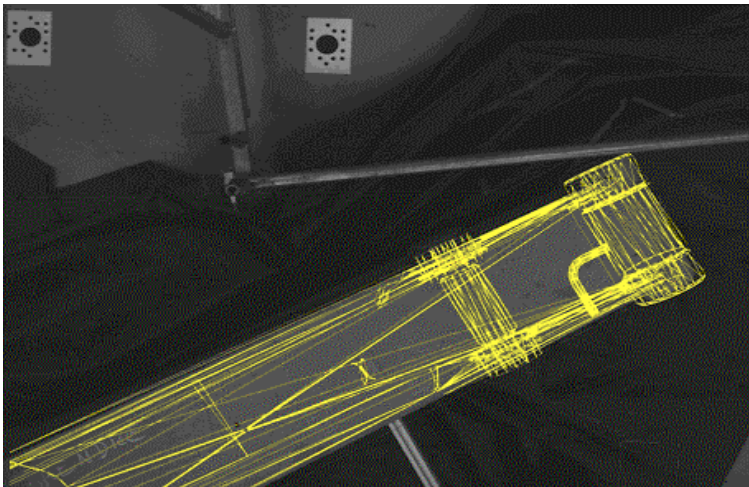
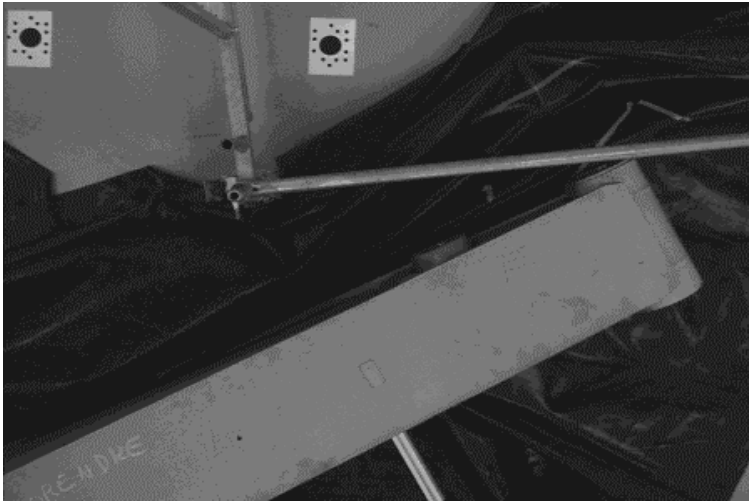


# Simulation System

- IGRIP software from Delmia
- Automated robot arm programming
- Automatic cell calibration
- Automated weld process planning
  - With welding database
- RTV route planning
- System monitoring & control



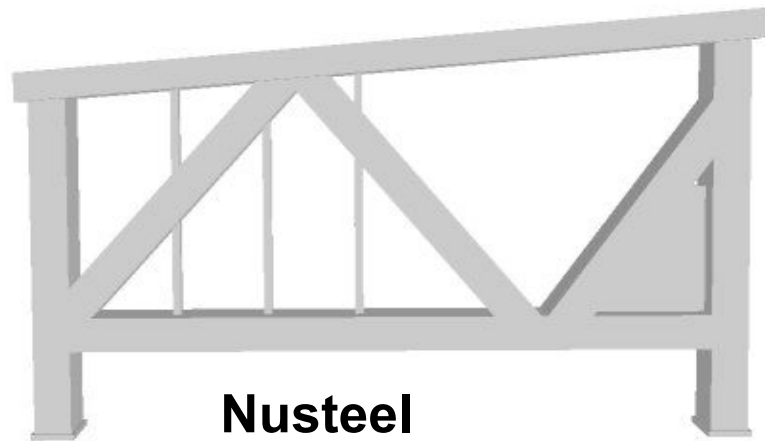
# Vision System



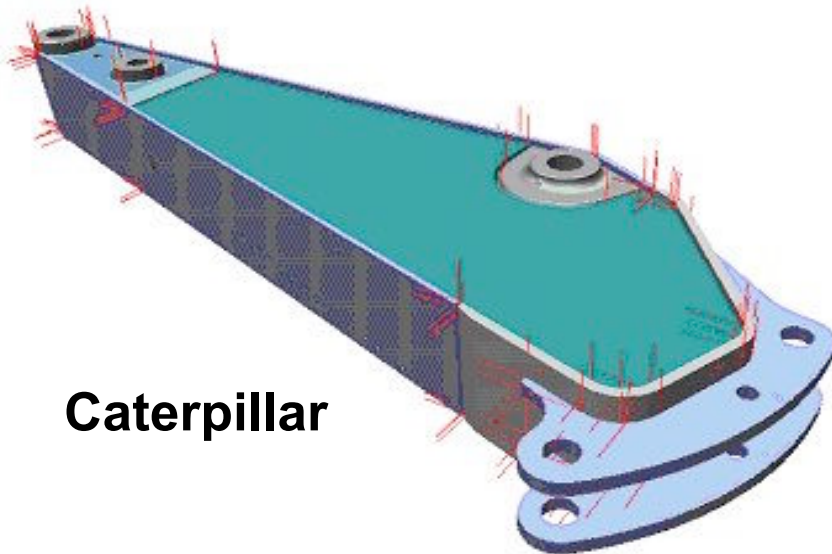
- Detects part location & orientation
- Confirms position of RTV
- Navigation of RTV



# Electronic Models



**Nusteel**



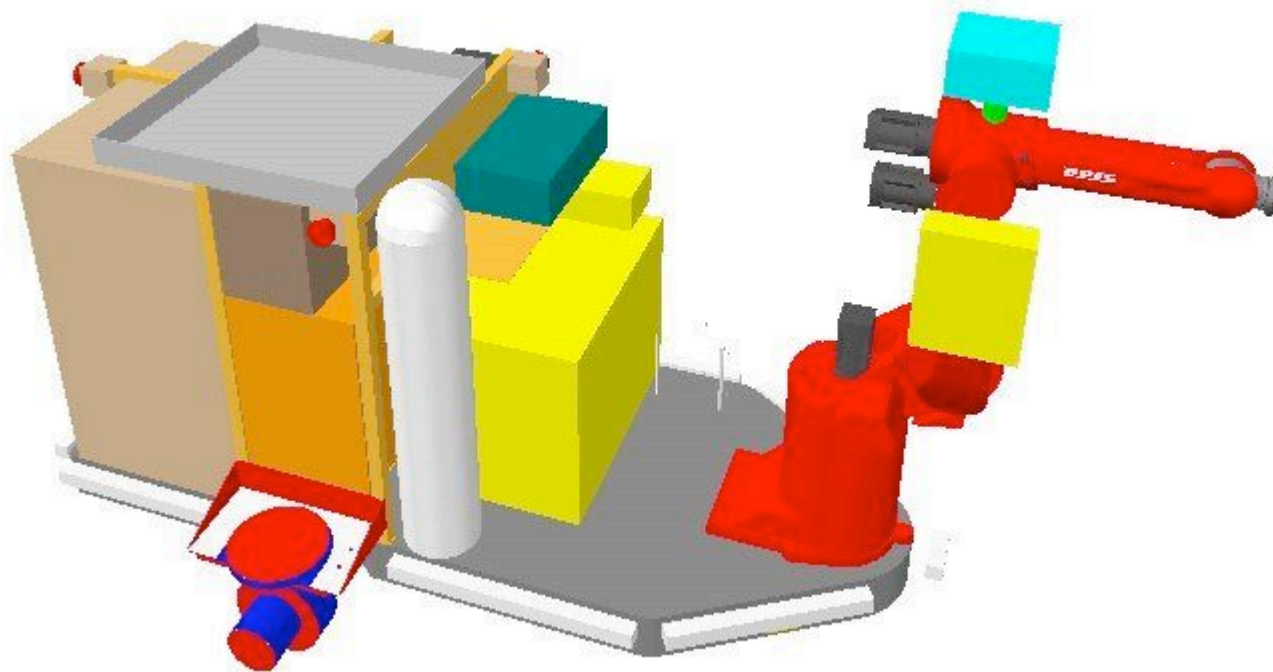
**Caterpillar**

- 3D format
  - ProE and AutoCAD
- Complimentary weld data file
  - Read by simulation system



# Robot Transport Vehicle

- Will carry all components necessary for welding
- Navigation by vision system & odometry



# Other

- All Position welding consumable
  - Start from metal core wire
- Welding database
  - Different joint types
  - Different joint orientations
- Demonstration Facility
  - Located at Caterpillar Belgium



# Why

- Product customization
  - Demand of the customer
- Faster Delivery of customized structures
- Reduce costs
  - Reduced labor
- Lack of skilled welders
- Health & safety
- No fixturing required



# Challenges

- Data transfer (CAD)
- Welding position accuracy
  - Sum of tolerances
- System integration
  - Many subsystems must communicate

