BASQUE INDUSTRY 4.0
The meeting point 2017

Massachusetts Institute of Technology

Krystyn J. Van Vliet

Massachusetts Institute of Technology - MIT

How digitised manufacturing changes the way we work, consume and live

BASQUE INDUSTRY 4.0

The meeting point 2017

Massachusetts Institute of Technology

GRUPO spri TALDEA

EUSKO JAURLARITZA GOBIERNO VASCO

EUSKADI BASQUE COUNTRY

AT&T LTE 3:59 PM 100%
Messages
FaceTime
Reminders
Wallet
Friday 24
Calendar
WebEx
Scannable
Evernote
18
Skype
GroupMe
MIT Mobile
Utilities
Camera
Photos
Voice Memos
News
68
Phone
Safari
Music
Gmail

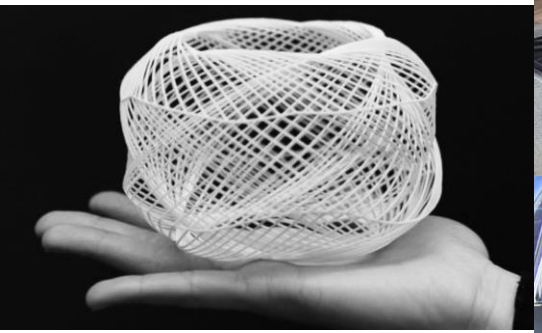
FOXCONN

Innovation

Production

Production Ecosystems

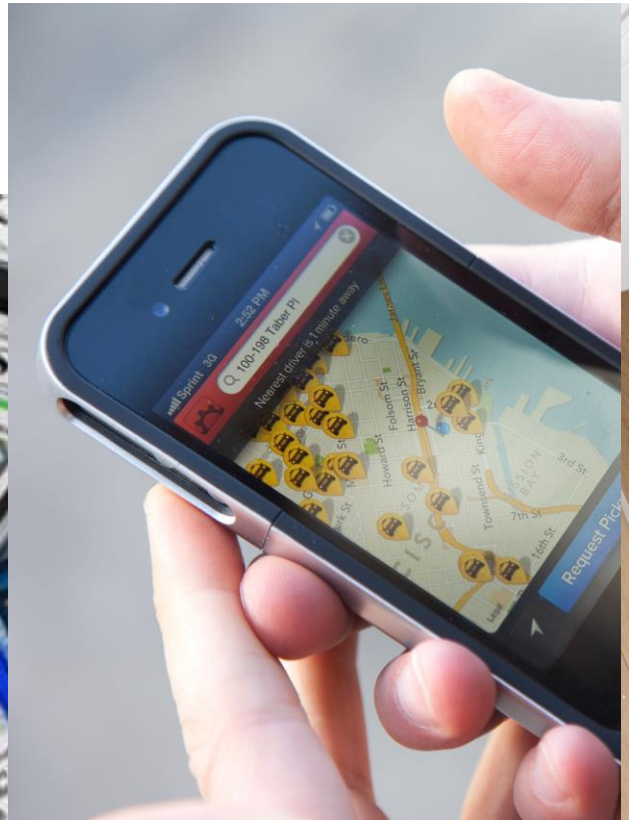
GRUPO spri TALDEA
EUSKO JAURLARITZA GOBIERNO VASCO
EUSKADI BASQUE COUNTRY



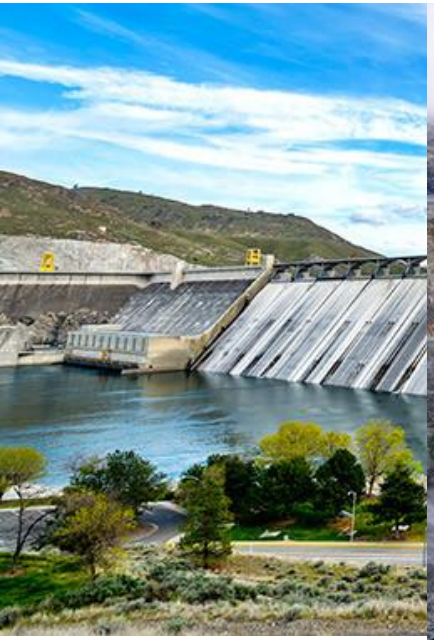
ORNL
ORNL

LOCAL MOTORS
PHOENIX

To the consumer…



To the consumer…

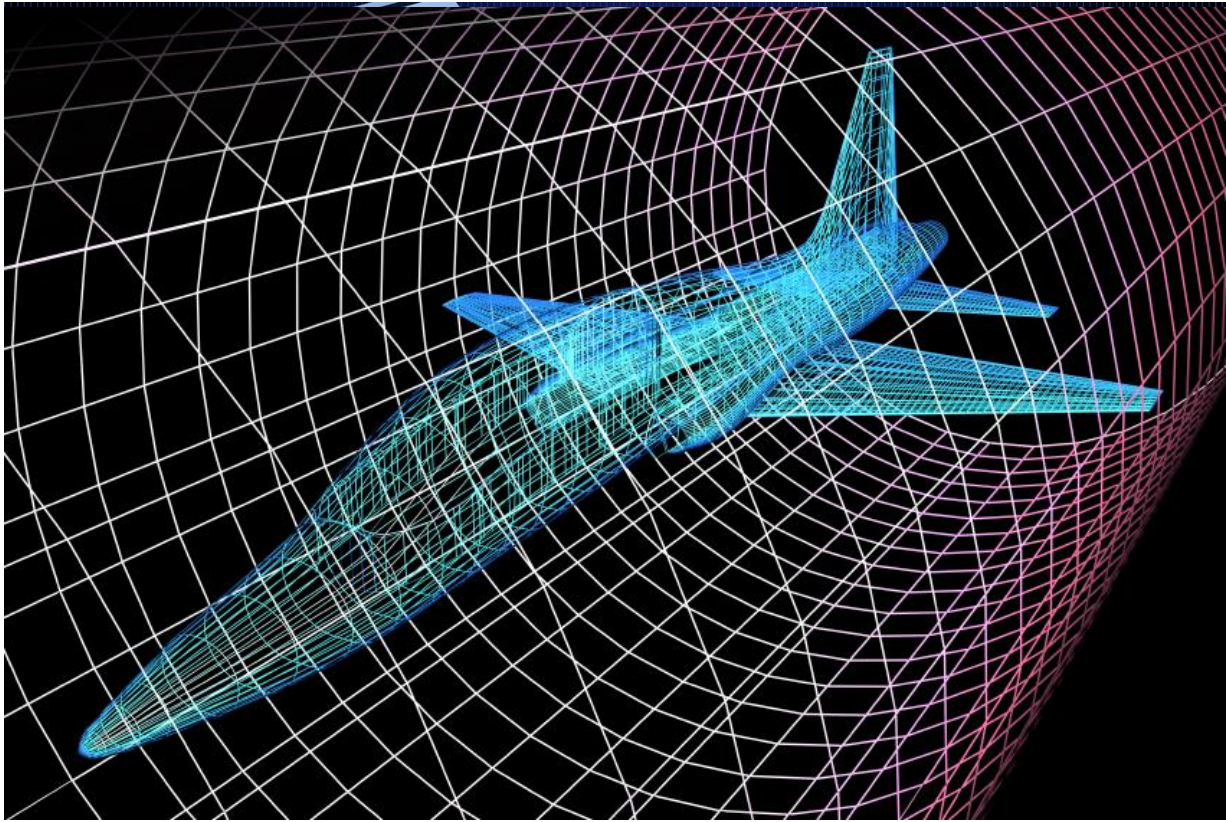


To the co-worker…

To the co-worker…

To the company…

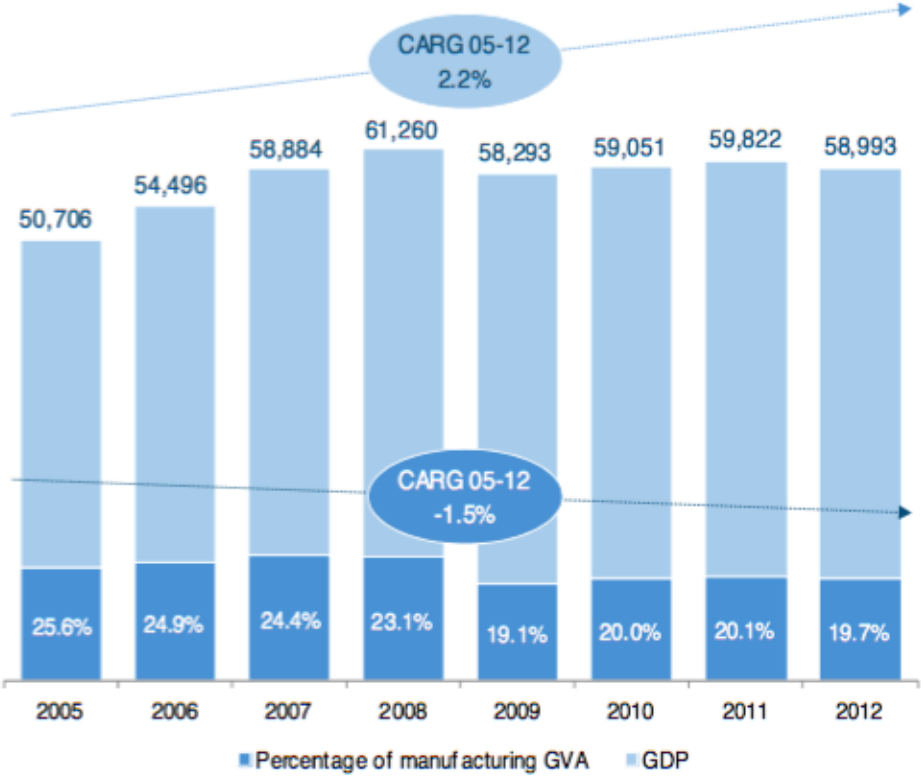
To the company…



To the country…

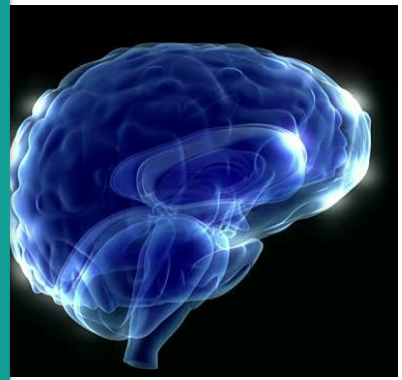
Industry 4.0 is a strategic investment for many regions, including Basque

- ✓ High value-add manufacturing
- ✓ High value-add jobs
- ✓ High value exports
- ✓ **High-risk / high-reward changes**



Source: sprie.eus

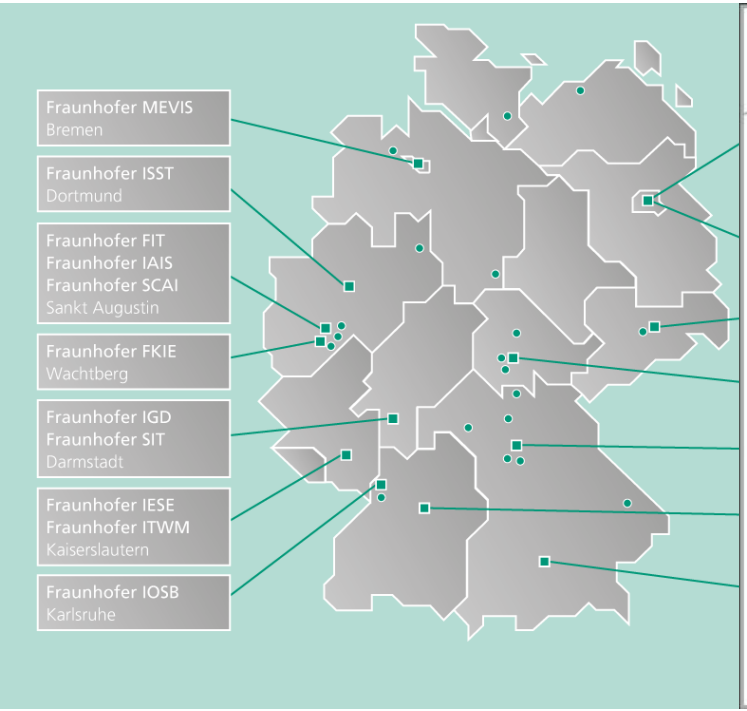
$

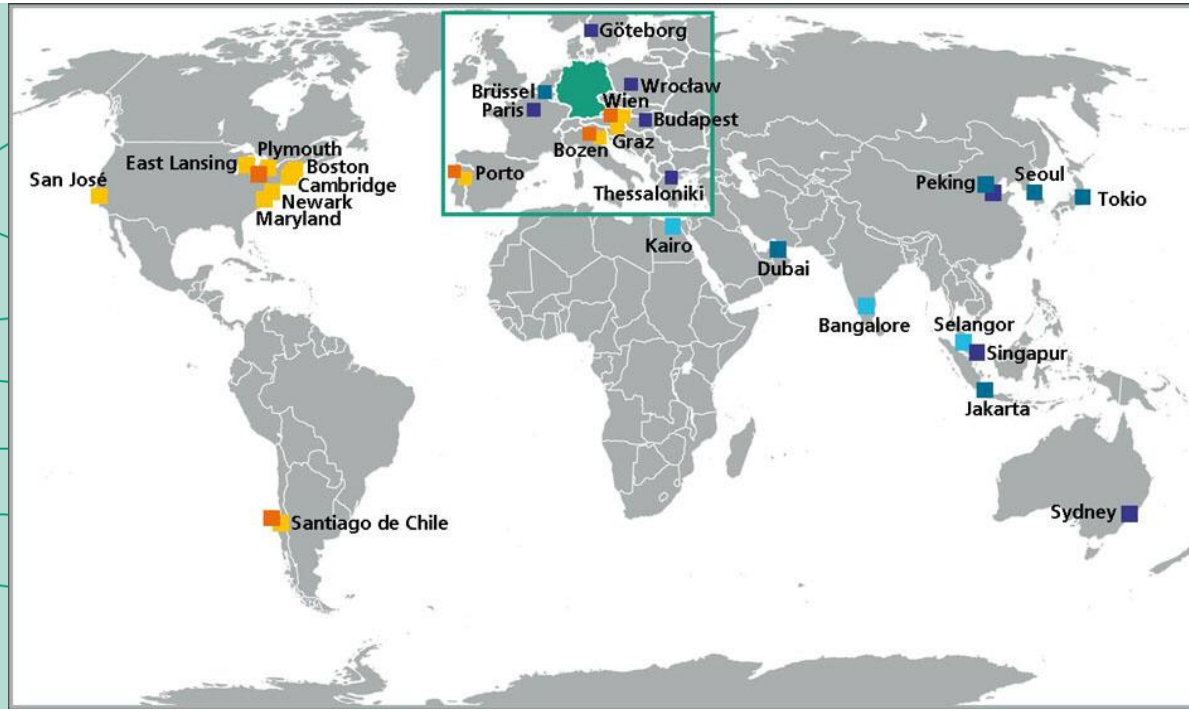


Production Scale

$
Production Scale

$
Production Scale





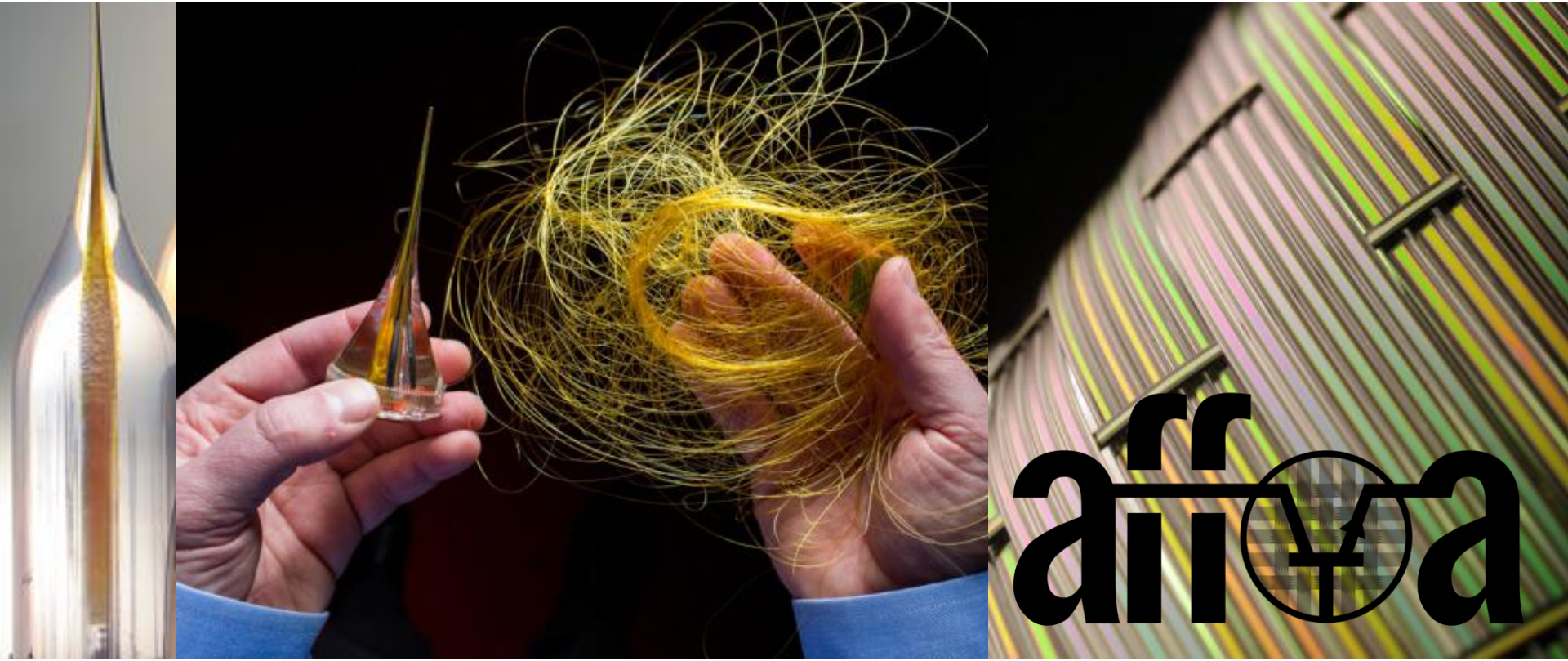
Massachusetts Institute of Technology

GRUPO spri TALDEA

EUSKO JAURLARITZA GOBIERNO VASCO

EUSKADI BASQUE COUNTRY

Manufacturing USA℠



Massachusetts Institute of Technology

GRUPO spri TALDEA

EUSKO JAURLARITZA GOBIERNO VASCO

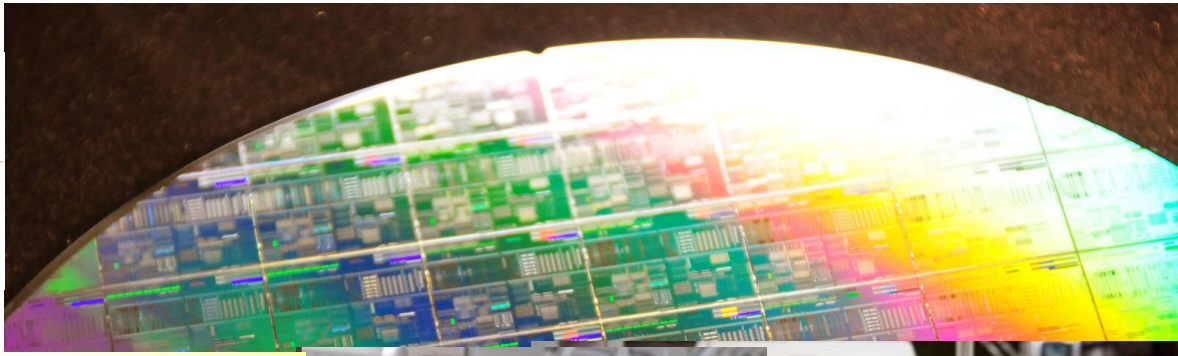
EUSKADI BASQUE COUNTRY

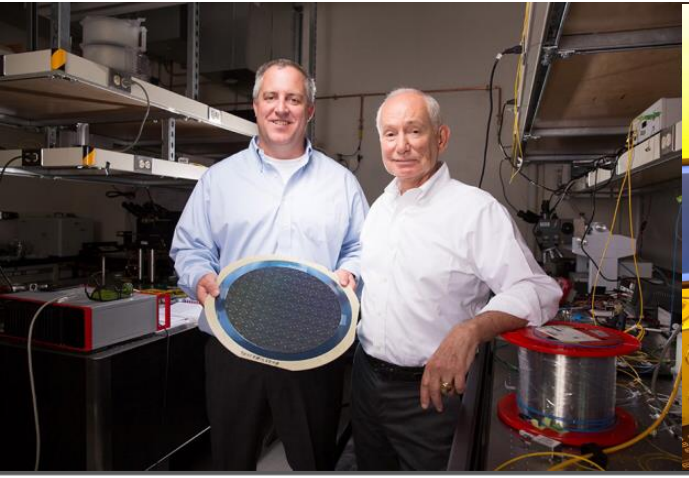
BASQUE INDUSTRY 4.0

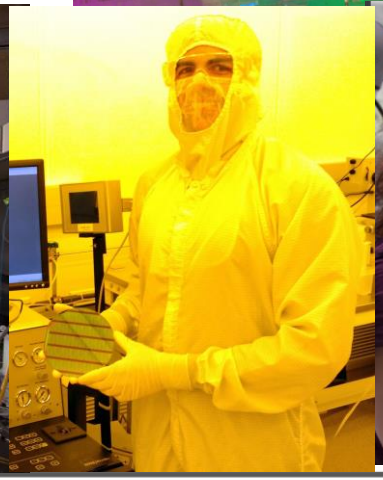
The meeting point 2017

AIM photonics

AMERICAN INSTITUTE for MANUFACTURING INTEGRATED PHOTONICS







Massachusetts Institute of Technology

GRUPO spri TALDEA

EUSKO JAURLARITZA GOBIERNO VASCO

EUSKADI BASQUE COUNTRY

Integrated Photonics Mfg

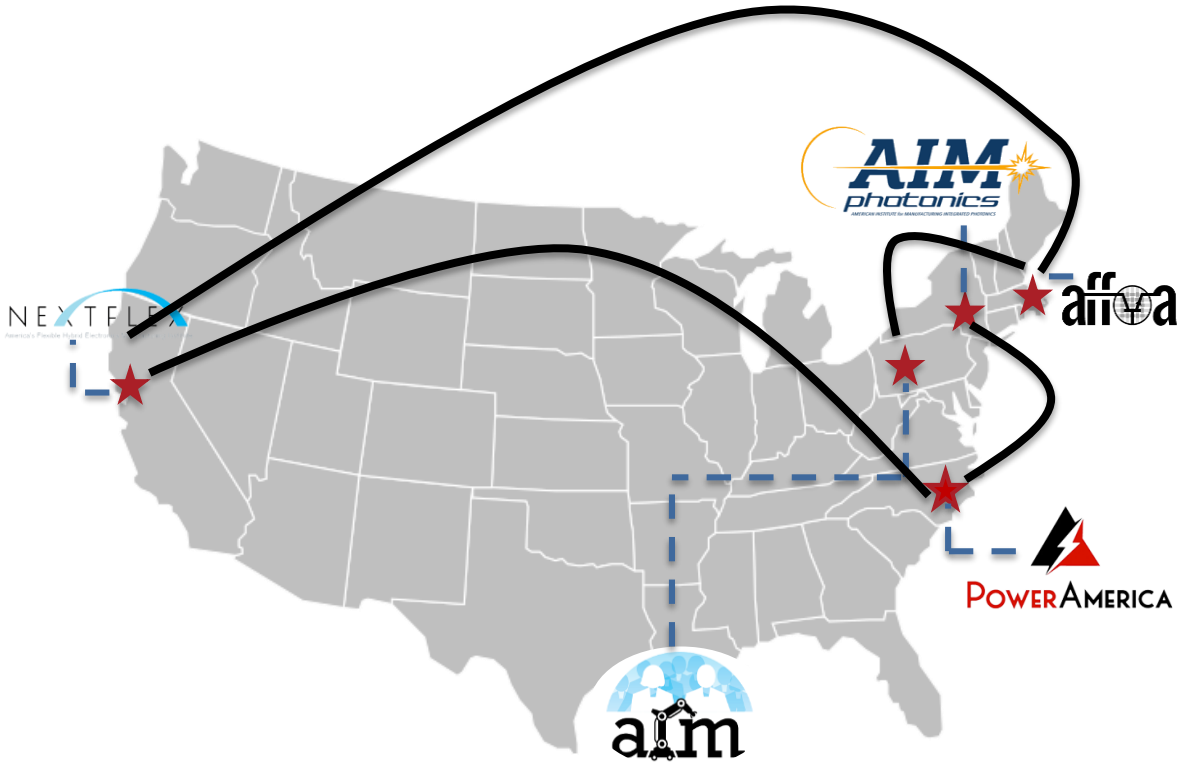
Low-Power Electronics Mfg

Flexible Electronics Mfg

Fiber & Textile Manufacturing

Robotics for Manufacturing

Manufacturing USA℠



Massachusetts Institute of Technology

GRUPO spri TALDEA

EUSKO JAURLARITZA GOBIERNO VASCO

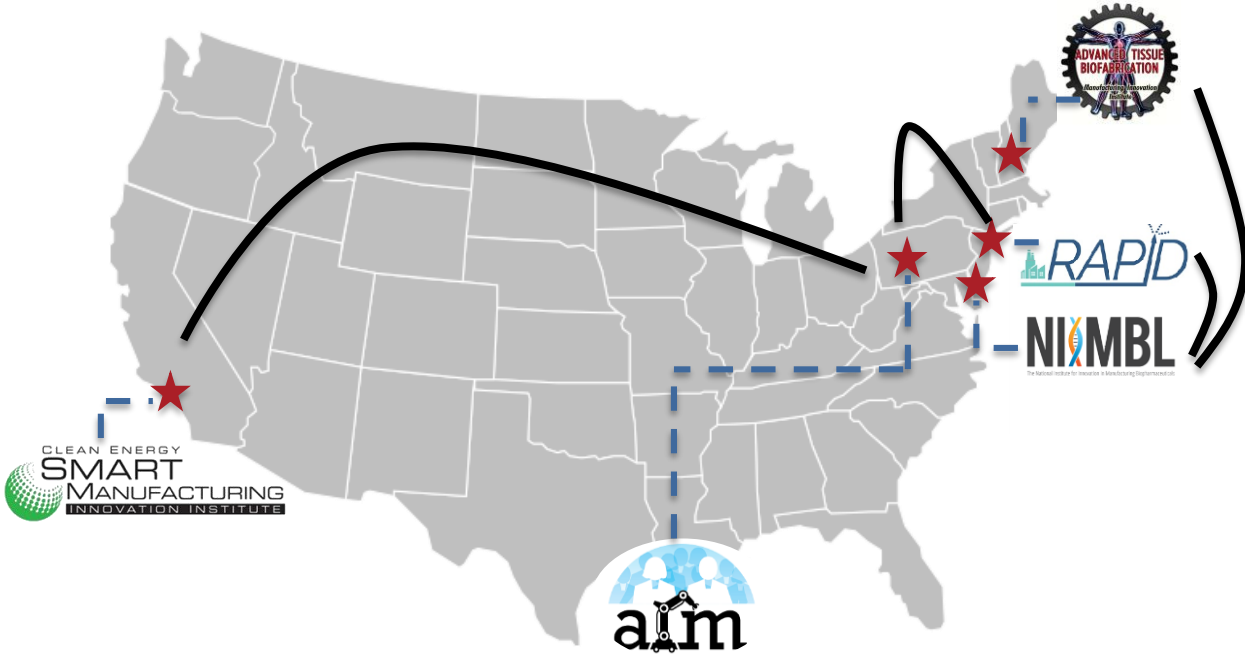
EUSKADI BASQUE COUNTRY

Biopharma Manufacturing

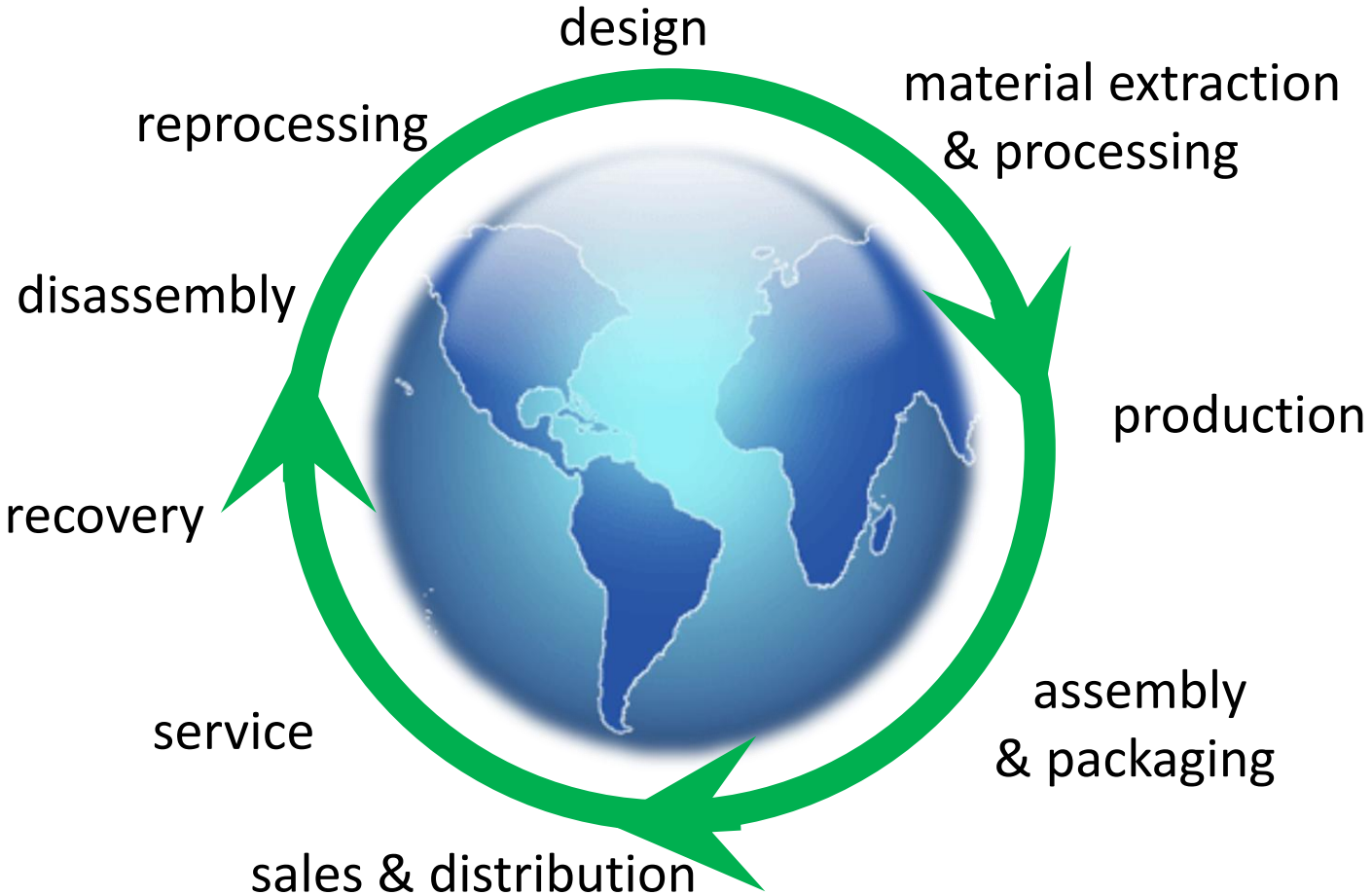
Process Intensification

Robotics For Manufacturing

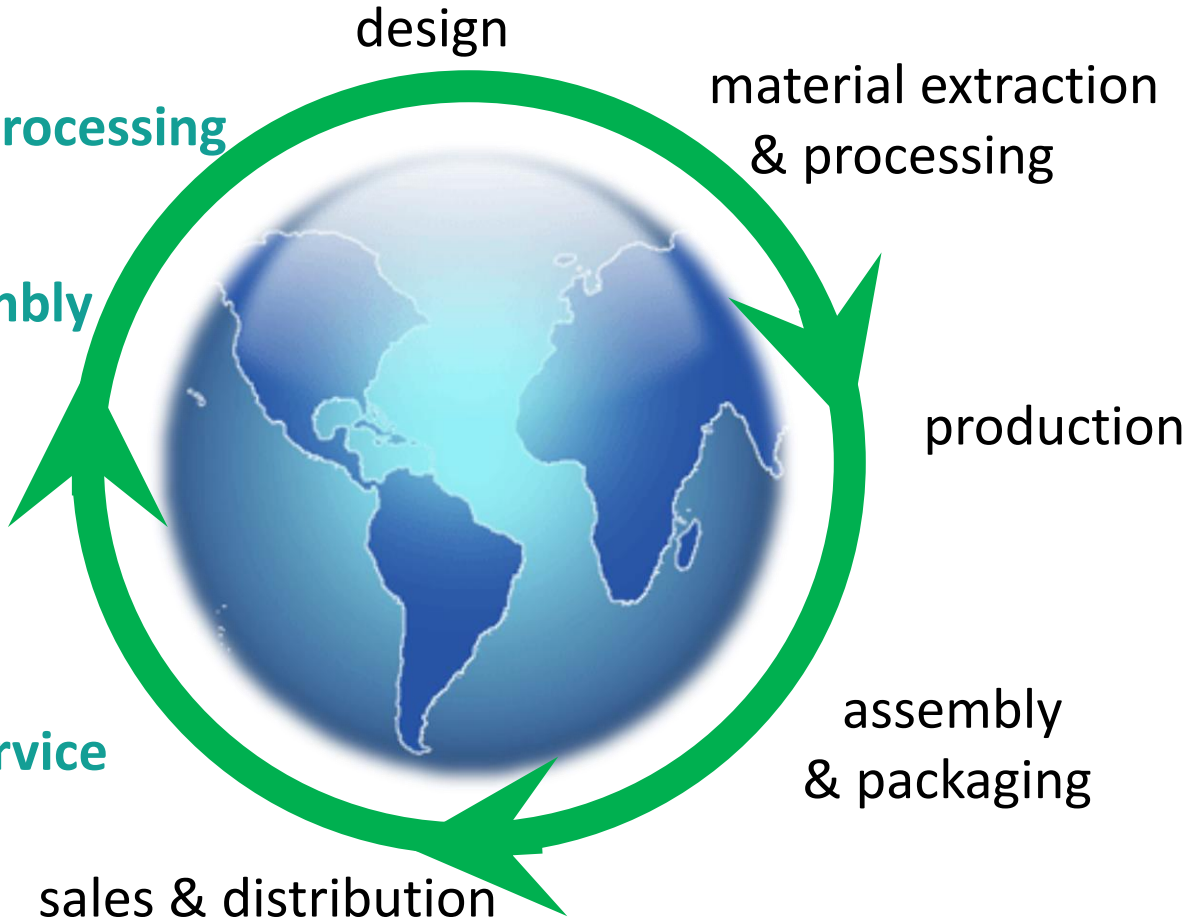
Smart (sensor) Manufacturing



Manufacturing USA℠


design
material extraction & processing
production
assembly & packaging
sales & distribution
service
recovery
disassembly
reprocessing

Key, undervalued components of advanced manufacturing



Where do I4.0 materials end up?

- ❑ *Desk drawers*
- ❑ *Landfills*
- ❑ *China*
- ❑ *Belgium*
- ❑ *?*

Are arcs of the circular Industry 4.0 economy accessible to developing economies? *YES.*

Capturing more of the I4.0 supply chain

Ford, Van Vliet and Olivetti (2015)

Circular economies with advanced manufacturing require *design for manufacturing sustainability*…

Rapidly developing economies with advanced manufacturing require *job reskilling to*

invent it here

<u>and</u>

make it here

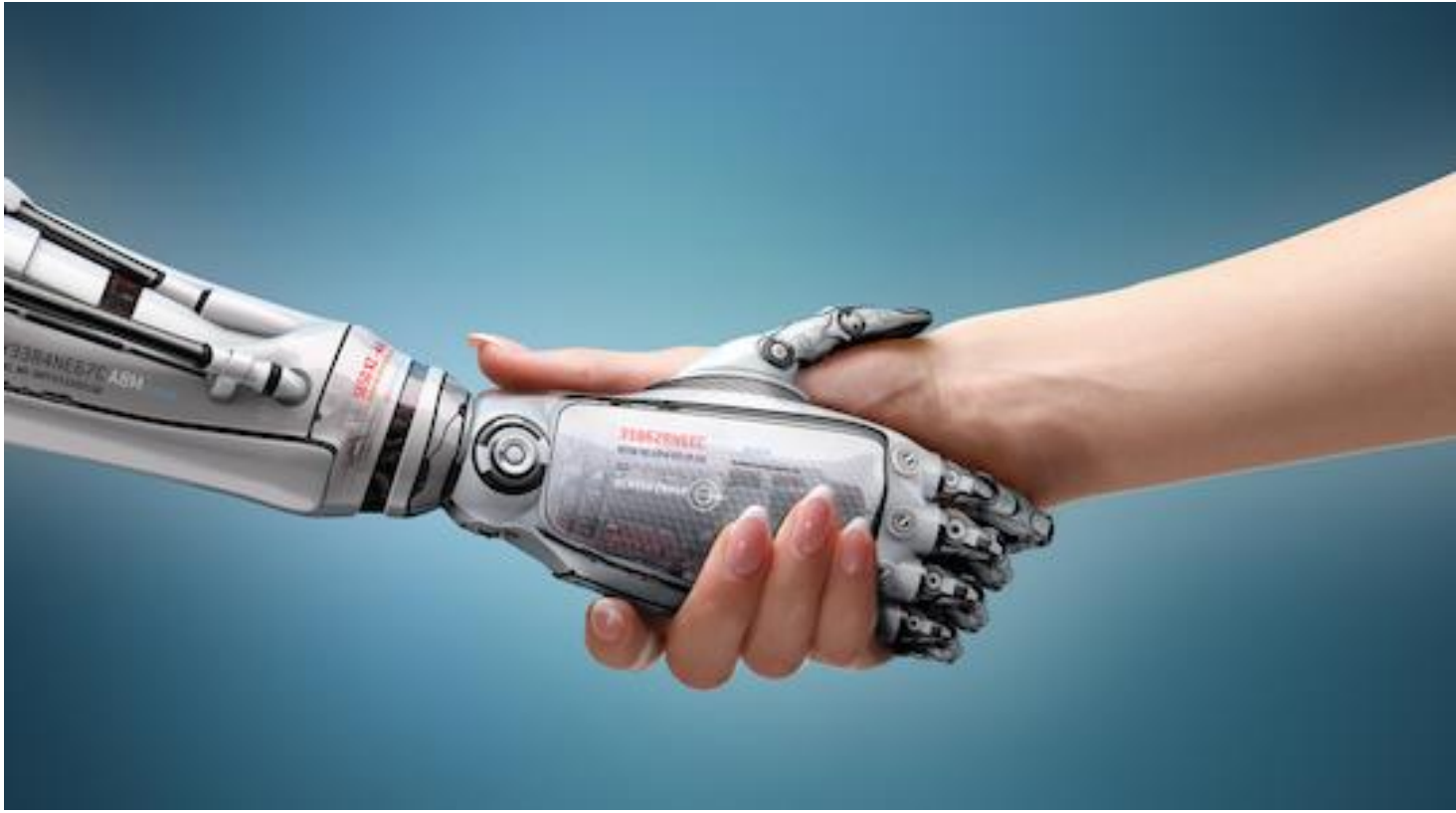
<u>or</u>

remake it here

Rapidly developing economies with advanced manufacturing require *job reskilling to invent it here* ***and* *make it here* ***or*** *remake it here* ***with*** *production & data integrity.***

BASQUE INDUSTRY 4.0

The meeting point 2017



KJ Van Vliet
krystyn@mit.edu

Massachusetts Institute of Technology

GRUPO spri TALDEA

EUSKO JAURLARITZA GOBIERNO VASCO

EUSKADI BASQUE COUNTRY