

A New GENetic LABoratory for non-invasive prenatal diagnosis



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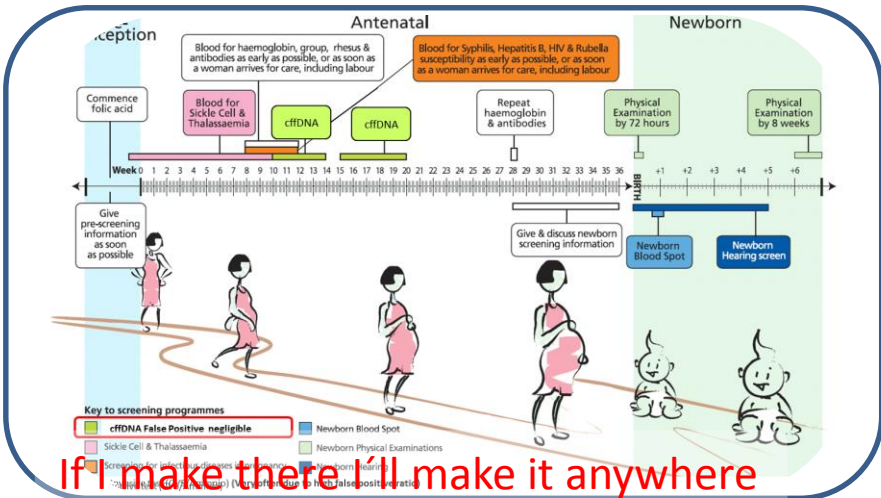
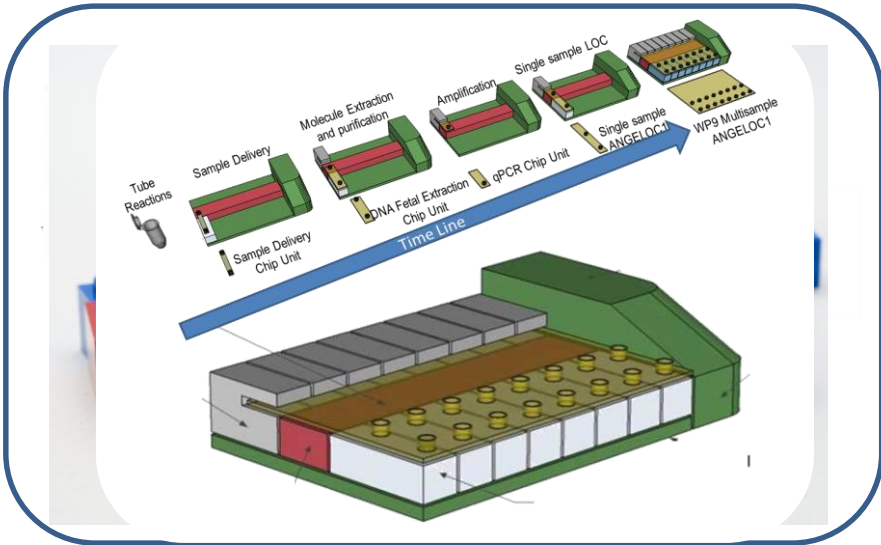
- IK4-IKERLAN S. Coop (Project Coordinator) Spain
- Ademtech SA France
- HSG – IMIT Germany
- OSAKIDETZA / Basque Health Service Spain
- Rioja Salud Foundation Spain
- Cyprus Institute of Neurology and Genetics Cyprus
- NIPD Genetics Ltd Cyprus
- Wrocław University of Technology Poland
- DNA Data Spain
- Biopharma Technology Ltd United Kingdom
- EVGroup Austria
- Fundación Gaiker Spain
- BioDonostia Spain
- CAN GmbH Germany
- POC MicroSolutions Spain

Content

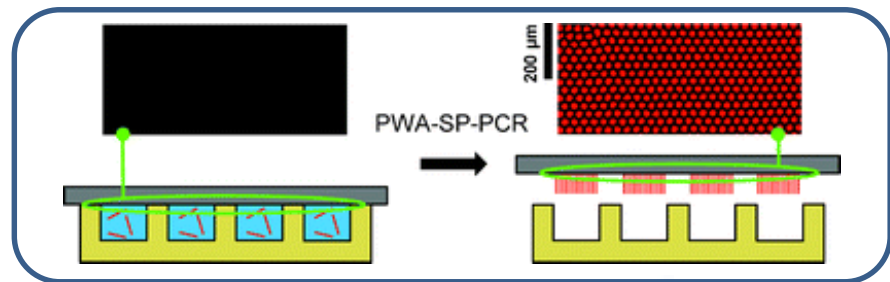
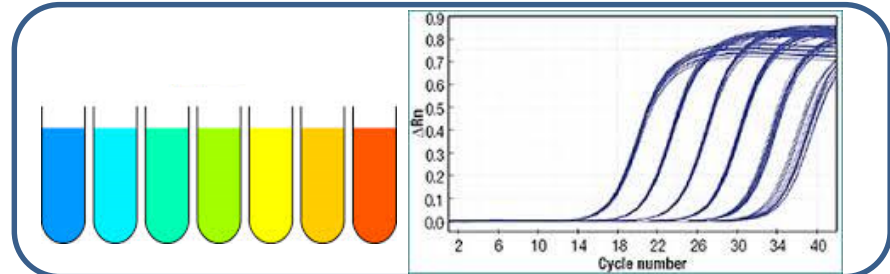
- ❑ Presentation of the project goal and consortium
- ❑ User Needs and Unique Value
- ❑ Innovation Process and Road to exploitation
- ❑ Distance to the market
- ❑ Manufacturing
- ❑ Access to the market



Goals and Consortium



If I make there I'll make it anywhere



ANGELAB benefits

Example: ANGELAB2 and MeDIP

MeDIP COST USING ONLY PIPETTE TIPS (8 samples)			
	COST (EUROS)	MATERIAL	EQUIPMENT
LIQUID HANDLERS			
Laboratory Developed Tests (LDT)			
ANGELAB SYSTEM			



Fewer consumables required for ANGELAB (Liquid handlers have lower tolerances)

→ Significantly reduced consumable costs.

Everything necessary for MeDIP as well as washes, elution and clean-up is contained inside ANGELOC2

→ No user intervention required during the run.
→ No additional equipment needed.

Investment required (e.g., €100-250k€)
Installation times and training requirements
Significantly smaller bench footprint
Greater flexibility in automated protocols

→ 10-50 k€
→ No user intervention required
→ Dish washer size.
→ No additional equipment needed.



This project is funded by the European Union

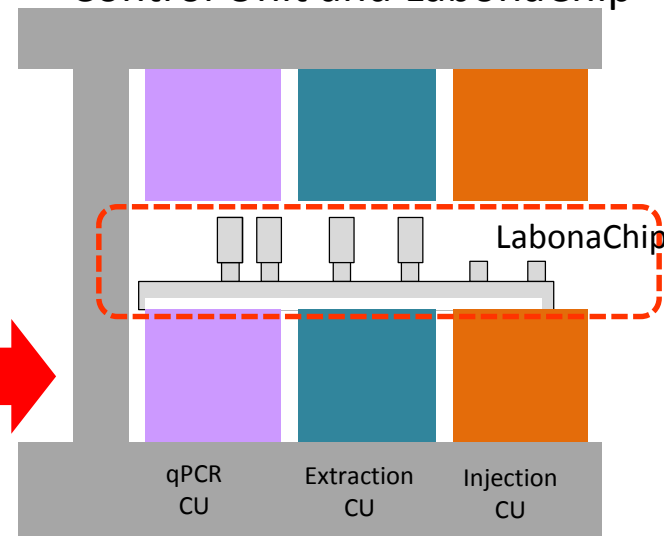
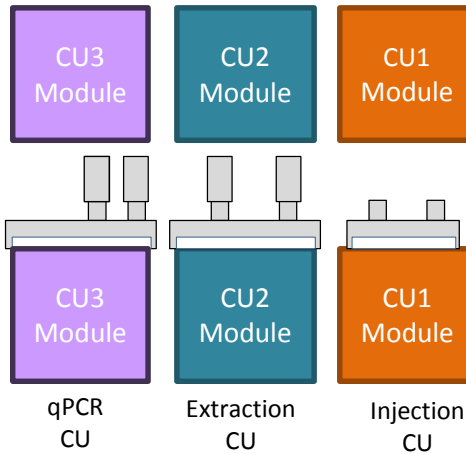
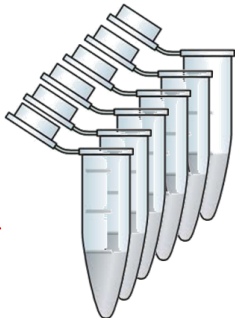
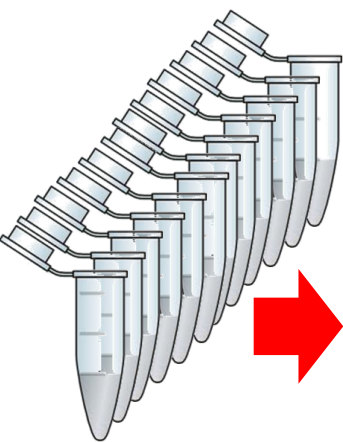
ANGELAB Unique Architecture

Tube Steps

Tube Functions

Modules and Chip Units

Control Unit and LabonaChip



TF Verification forms

CU Verification forms

LOC Verification forms

Sample/reagent Injection Group	Tube Injection Steps	Inputs	Outputs	Strategy	F
Extraction	Extract blood from patient by... Place sample into a Eppendorf tube Divide the sample for control	Blood in veins Blood in a tube One sample	Blood in a tube Blood in eppendorf Two samples	New method based on a combination of a needle and... New method based on a combination of a needle and... New method based on...	CH1.1 CH1.2 CH1.3

Sample/reagent Injection Steps	F	Strategy or Function Name	Inputs	Outputs	Number of Assays	Objective	S _u	Control method	Safety
Extract blood from patient by... Place sample into a Eppendorf tube Divide the sample for control purpose	f1.1 f1.2 f1.3	New method based on a combination of a needle and... New method based on... New method based on...	Blood in veins Blood in a tube Blood in eppendorf One sample	Blood in a tube Blood in eppendorf Two samples					CH1.1 CH1.2 CH1.3

Sample/reagent Injection steps	P	I	R	Mitigation	Contingency
fr1.1 New method based on a combination of a needle and...				H	
fr1.2 New method based on				H	
Sample preparation steps	P	I	R	Mitigation	Contingency
fr2.1 Adding reagents and incubation				L	
fr2.3 Add all at once and incubate for MoDIP				L	
fr2.x Sonicate DNA can not be reached				H	Use thin covers Out of the chip
Detection steps	P	I	R	Mitigation	Contingency
fr3.1 Add PCR reagents plus fluorophores					

Sample/reagent Injection steps	P	I	R	Mitigation	Contingency
cr1.1 New method based on a combination of a needle and...				H	
cr1.2 New method based on				H	
cr1.3 New method based on					
Sample preparation steps	P	I	R	Mitigation	Contingency
cr2.1 Standard Used Method				L	
cr2.3 New method based on				L	
cr2.x Sonicate DNA can not be reached				H	H H H Use thin covers Out of the chip
Detection steps	P	I	R	Mitigation	Contingency
cr3.1 Add fluorophore					

WP1 Del1.2: LABONACHIP UNIT FUNCTION PERFORMANCE TEST DESCRIPTION	
LABONACHIP CODE	ANGELAB1_CU0 + CU1 + CU2 + CU3 + CU4+ CU5 + CU6 + CU7+CU8
NAME	AngeLoC1 verification
DESCRIPTION	<p>AngeLoC1 consists of 2 very similar analysis lines (see Figure 1) and 3 identical qPCR control lines:</p> <ul style="list-style-type: none"> The first analysis line (sample analysis line) is based on 7 chip units dedicated to extract fDNA from maternal plasma, followed by another chip unit to divide the extracted fDNA sample in three aliquots and detect point mutations by triplicate qPCR. Homozygous, heterozygous and wild type mutations, as well as housekeeping gene will be detected in each aliquot (see Figure 2). The second analysis line (water analysis line) is based on the same 7 chip units dedicated to extract fDNA as in the previous line, followed by an 8th one consisting of a unique qPCR chamber. In this case, water will be used as starting sample since this analysis line is intended to be used to verify whether is contamination in AngeLoC1. The 3 identical qPCR control lines are based on one chip unit dedicated to amplify the internal DNA

® Registered methodology Ikerlan-Ik4 IVD POC Methodology



ANGELAB



This project is funded by the European Union

Innovation Road: ANGELAB versatility



ANGELAB 2014

Currently Tested on NIPD apps

317635

Your own IVD

Ready for End Users



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For any Nucleic Acid or Immunoassays IVDs

Put your Laboratory Developed Test in an IVD



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How do we know? Storytelling

“Good designers can create normalcy out of chaos; they can clearly communicate ideas through the organizing and manipulating of words and pictures.”—Jeffery Veen, 2000

Objective

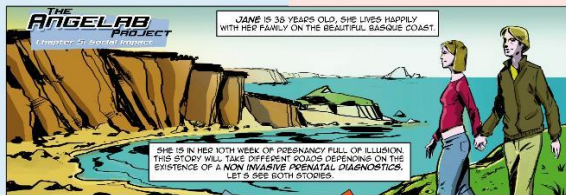
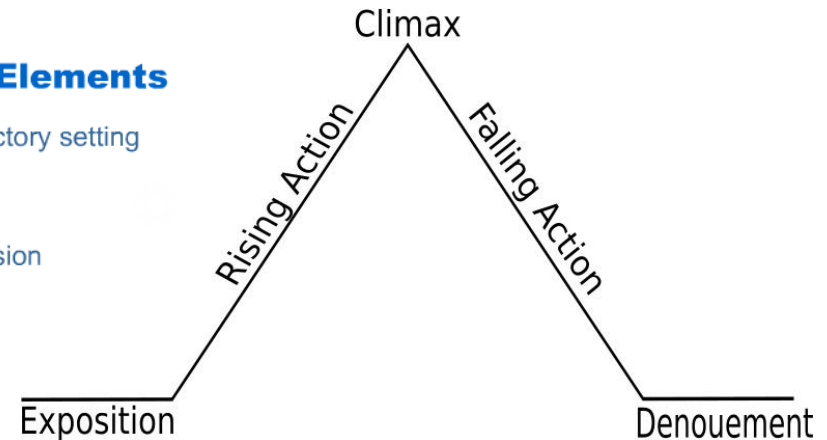
To think about the design of the solution: think about its parts and functioning

Steps and Story Elements

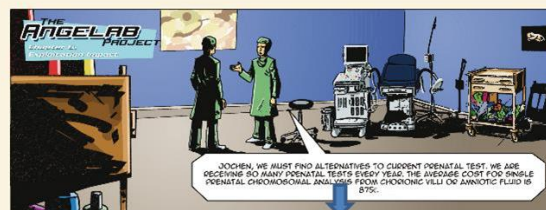
- 1) The nowadays situation
- 2) The desired situation
- 3) The stages to solve the solution
- 4) The actors
- 5) The actions
- 6) The artifacts

Story Elements

- Introductory setting
- Action
- Climax
- Conclusion



Social Story A



Visit of a sales person



Scenario of use



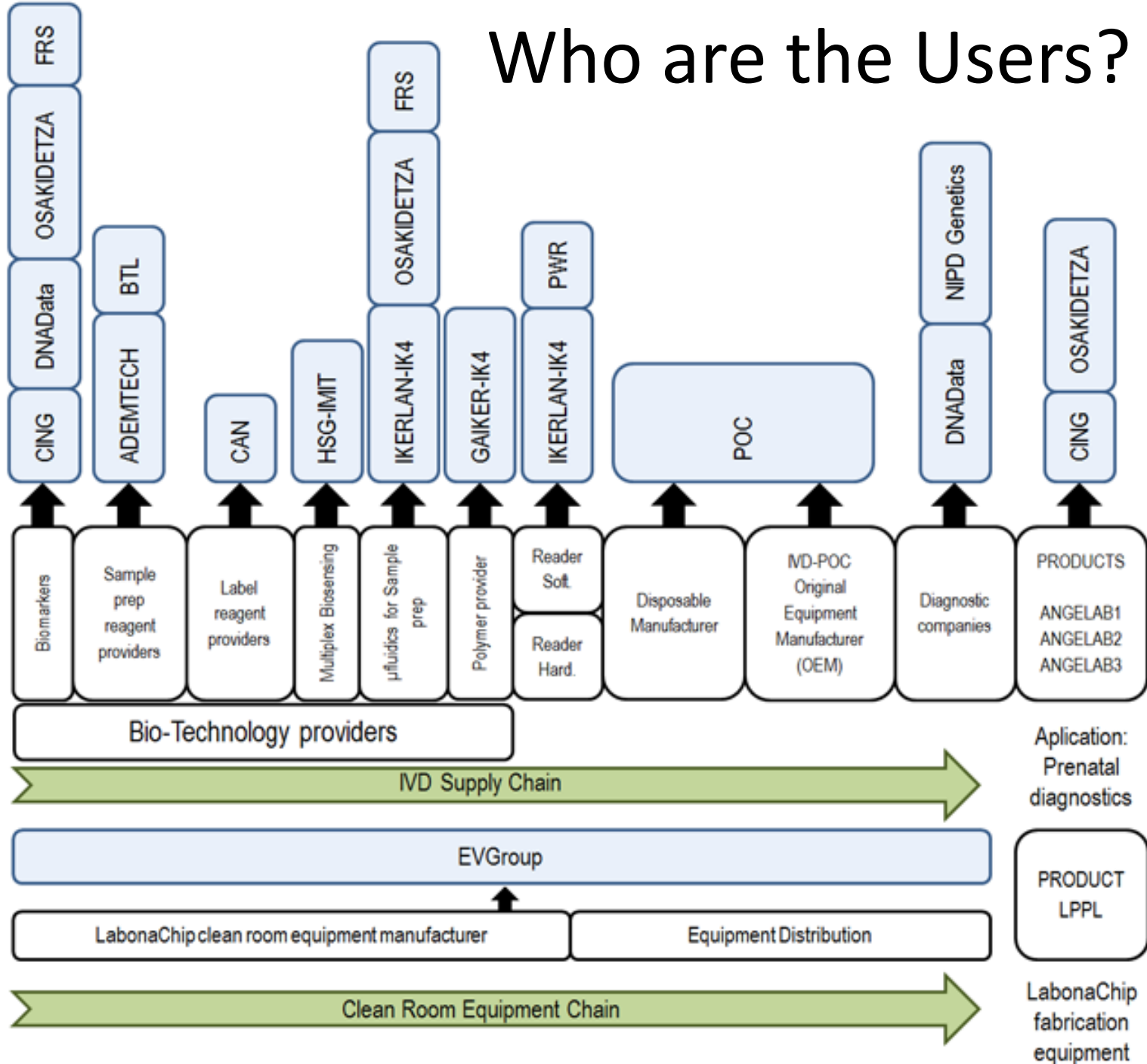
How do you explain the advantage?

- By preparing demonstrators that are self contained SYSTEMS
- By including the components in these demonstrators
- By a versatile architecture



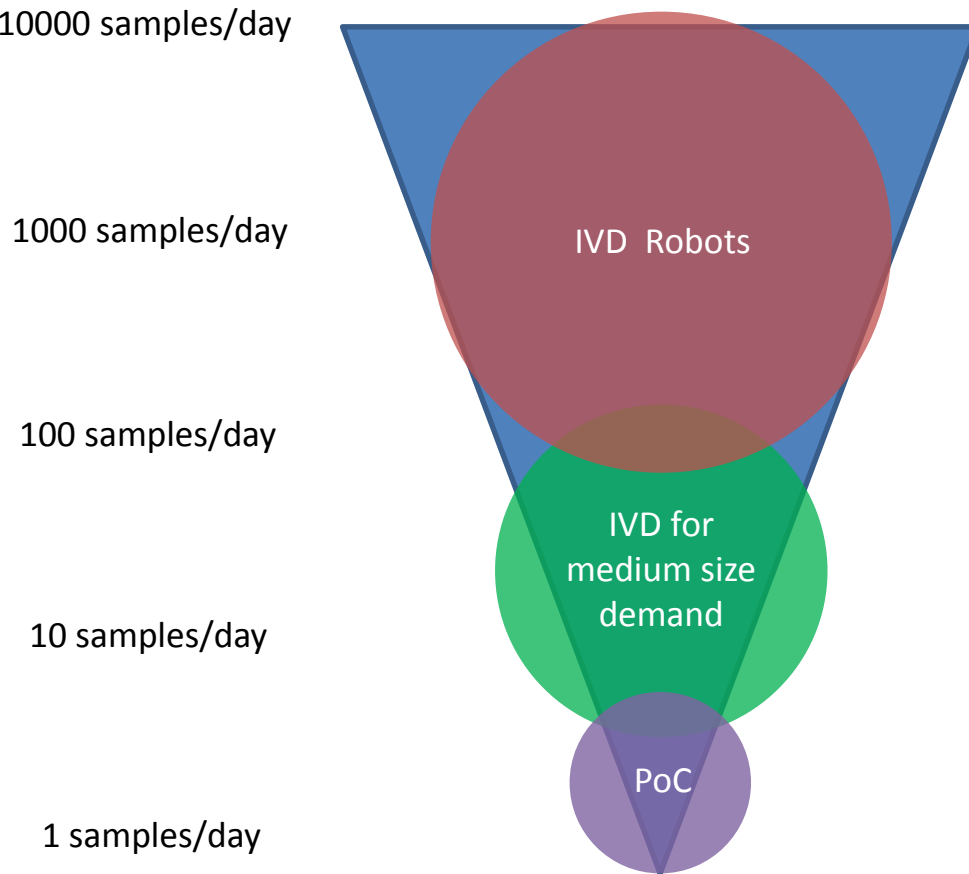
Who are the Users?

There is not just one road, nor one user



Innovation Road

Niche market and New EU Medical standard



- Medical Devices Directive (98/79/EEC)
 - Exemption of laboratory developed tests (LDTs)
- New EU regulations for medical devices and IVDs (entry into force 2015-2019)
 - Mechanism to ensure safety and effectiveness of IVD devices
 - Address lack of evaluation of laboratory developed tests (LDTs)

Innovation Road: ANGELAB versatility

- ❑ NIPD systems
- ❑ LabonaChip Pilot Plant Line
- ❑ Integrated solution for automatic microfluidic:
 - Incubator.
 - Sample extractor (DNA, proteins) by magnetophoresis.
 - Sample purification.
 - Heater.
 - Cooler.
 - DNA denaturation.
 - PCR module up to four-plex.
 - Sample preparation on chip Module.
 - Mixer.
 - Cell lysis of – and + cells. (from other projects)
 - Splitters.
 - Alicuoter.
 - Valves.
 - Pump.
- ❑ Solid and liquid reagent storage on chip.
- ❑ Optical fluorescence biosensor with 4 wavelengths.
- ❑ Microfluidic control for reagents synthesis (minireactors).
- ❑ Customised minirobots to transfer LDTs to a LOC.
- ❑ A service provider of courses to transfer LDTs to a LOC through methodology (just a possibility).

- Preparing an Exploitation agreement (no quantify the potential value)
- Knowledge flow diagram that identifies everyone role in each system or subcomponent

A combination of these components can be provided on demand

- Continuous search for gold nuggets.
- Disease fragmentation of the Intellectual Property is a good strategy for customers.



Distance to the market 1/3

- The exploitation activities will be aligned within a process towards PRENATAL DIAGNOSIS AND THEN PRENATAL SCREENING. This will go through three stages:

Market Analysis

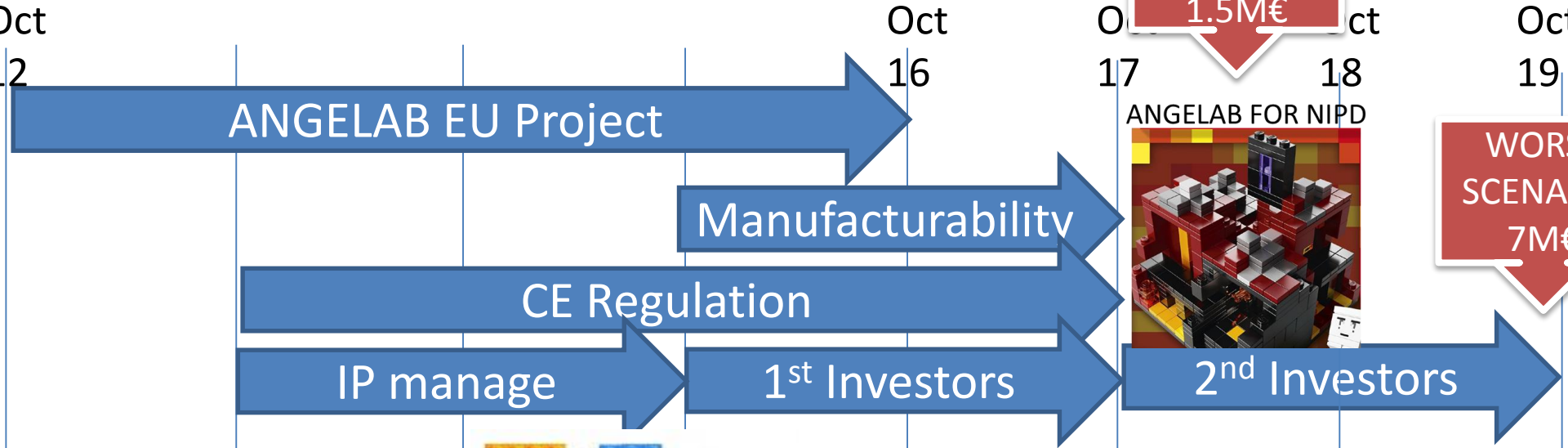
Country/Region	Population ¹	Target Population
US	310.233.000	310.233.000
EU	495.122.000	495.122.000
Canada	33.639.000	33.639.000
Australia	21.472.000	21.472.000
New Zealand	4.258.000	4.258.000
Japan	127.176.000	127.176.000
Korea	48.875.000	48.875.000
Brazil ²	195.423.000	97.711.500
Russian Federation ²	140.367.000	14.036.700
South Africa ²	50.492.000	5.049.200
China ²	1.354.147.000	67.707.350
India ²	1.176.742.000	35.302.260
TOTAL	3.957.946.000	1.260.582.010

**Total target population:
1.260.582.010.**

- **High-risk:**
- 7% of pregnancies (700 per 1.000.000 of population)
- **Precious:**
- 20% of pregnancies (2.000 per 1.000.000 of population)
- **All:**
- All pregnancies (10.000 per 1.000.000 of population)

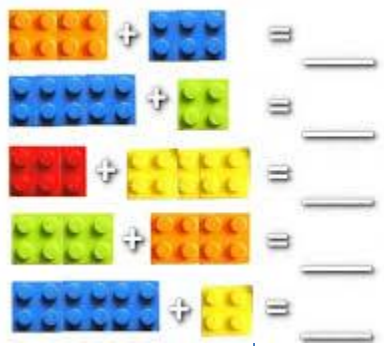
- Therefore, our ANGELAB system will go through the above three stages and start as non-invasive PRENATAL DIAGNOSIS and end up a PRENATAL SCREENING.

Distance to the market 2/3



BEST SCENARIO
1.5M€

WORST SCENARIO
7M€



cfDNA
Cancer



Infectious
Diseases



Food



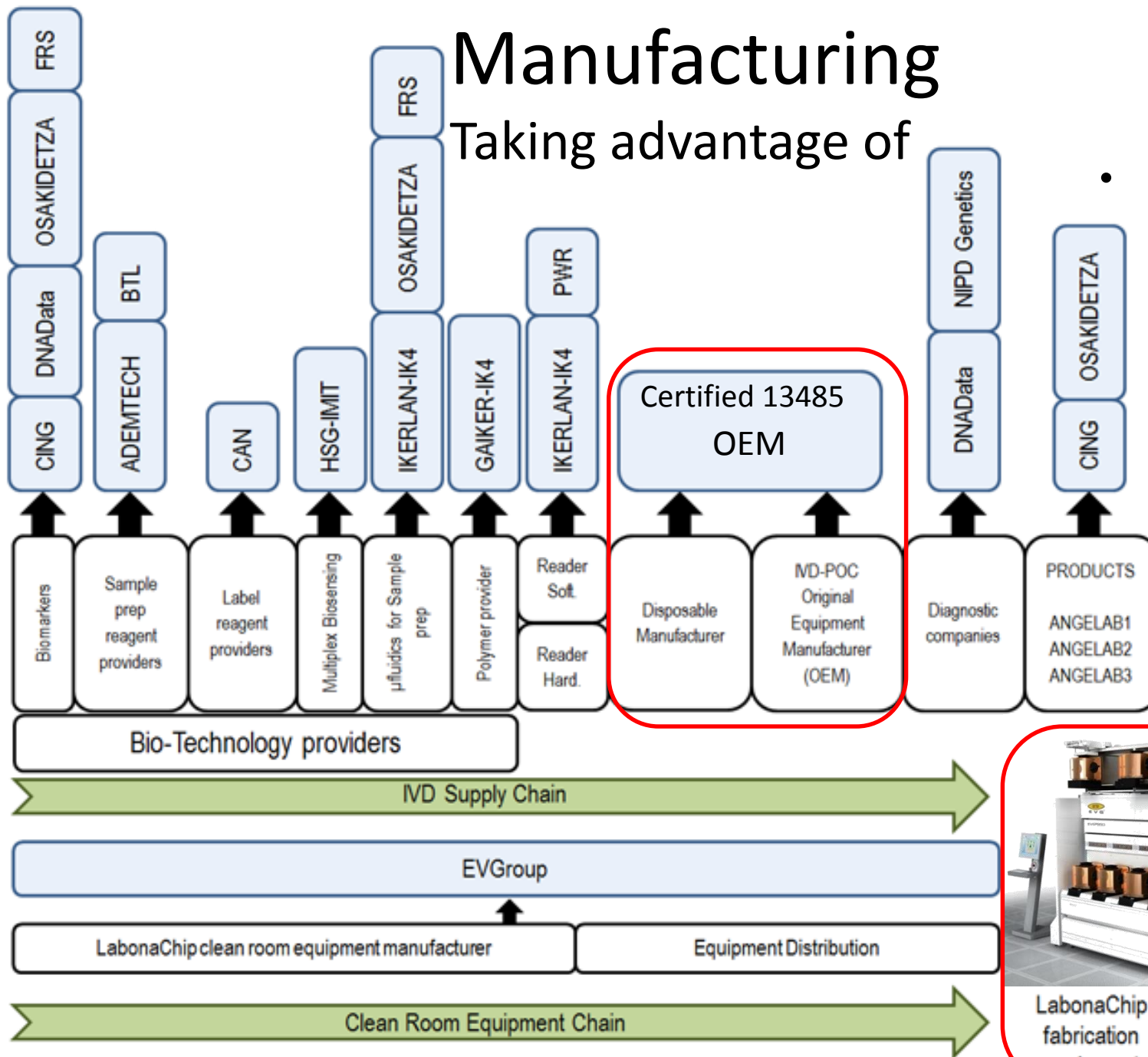
Env



Manufacturing

Taking advantage of

- «commercial agents»: the manufacturer, the authorized representative, the importer and distributor





Thank you

jmruano@Ikerlan.es



Osakidetza



Wrocław University of Technology



Project partners:

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Currently
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NIPD apps

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Your
own IVD

Ready for
End
Users

