POLITECNICO
MILANO 1863

Knowledge transfer into a System Design Process

the case study of
"S(P)EEDKITS - Rapid deployable kits as seeds of self-recovery"

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RESEARCH OVERVIEW

SPEEDKITS
rapid deployable kits as seeds for self-recovery

SEVENTH FRAMEWORK PROGRAMME

www.speedkits.eu

COLLABORATIVE PROJECT (2012-2016) → co-financed by European Union's 7th Framework Programme under the Security Theme (SEC-2011.4.2-3)

AIM → rethinking shelters, medical care resources and other facilities provided in case of natural disaster and conflicts.

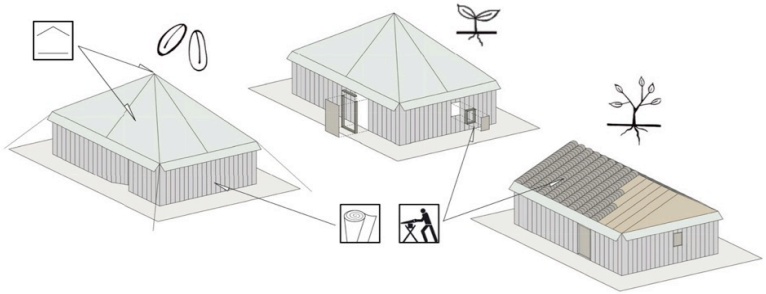
PARTNERS → research institutes, universities, private companies and non-profit organizations operating in the emergency sector

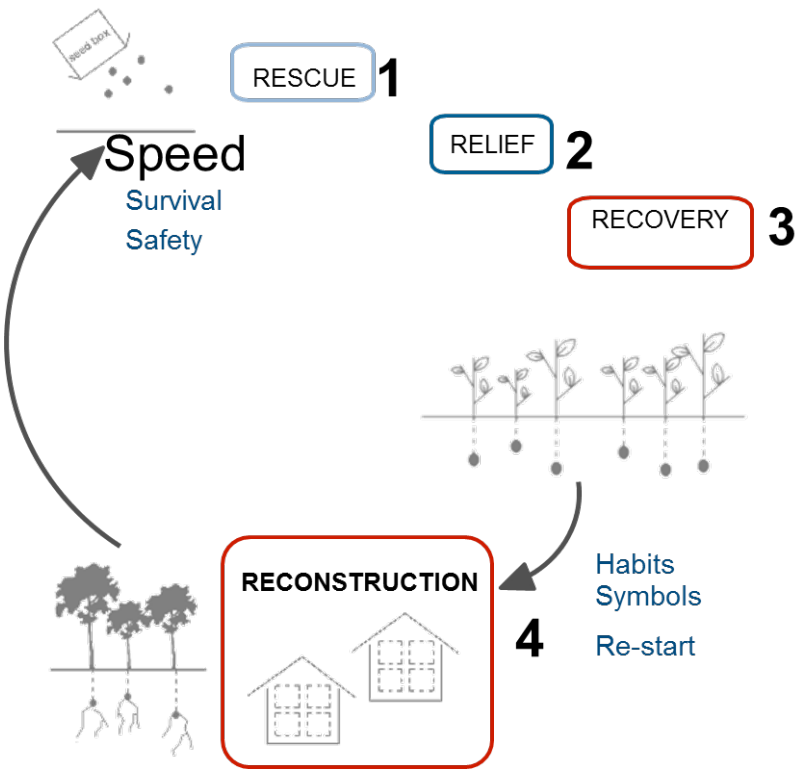
RESEARCH OVERVIEW → Challenges

SPEEDKITS

rapid deployable kits as seeds for self-recovery

From SPEED to SEED





Source: Tents, UN/OCHA, 2004

different phases

RESCUE	RELIEF	RECOVERY	RECONSTRUCTION
first 48 hours	after 48 hours	from 2/4 weeks	

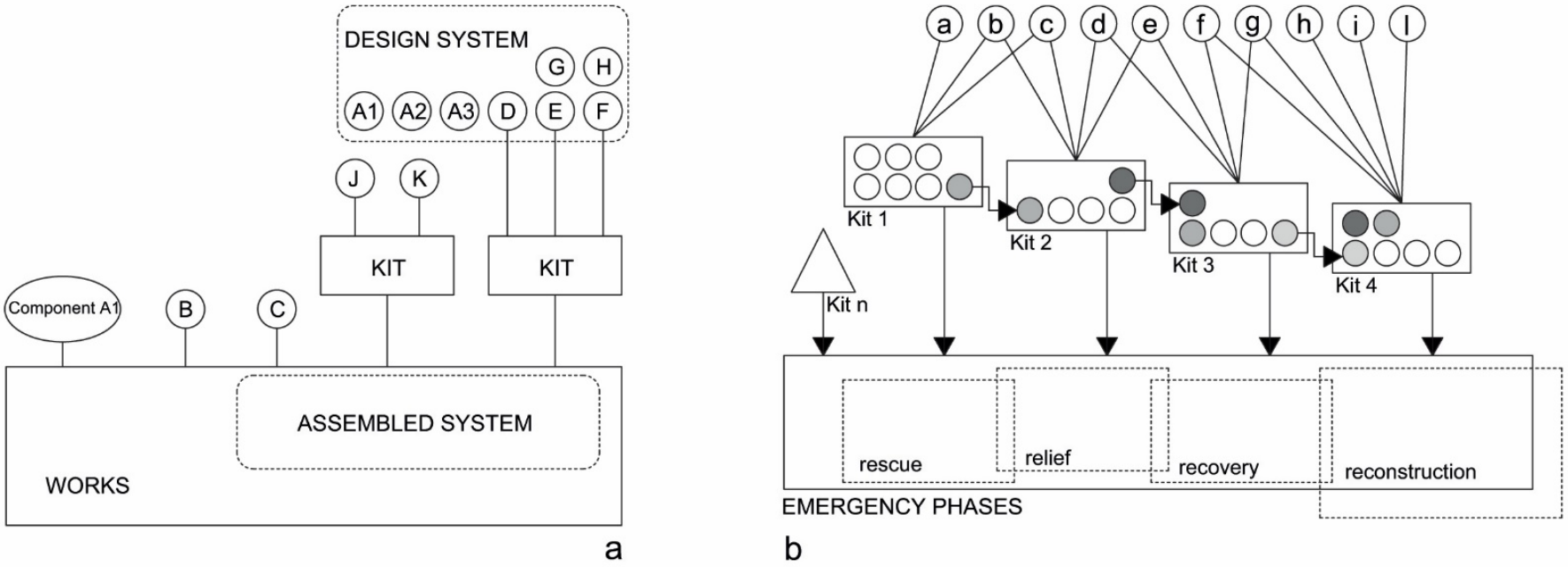
RESEARCH OVERVIEW → Challenges

SPEEDKITS
rapid deployable kits as seeds for self-recovery

Collaborative partnership between
NGOs (= real needs), Academia (=research)
and Private Companies (=Production)

Bottom-up approach →
Designing Components (no prefab shelters)

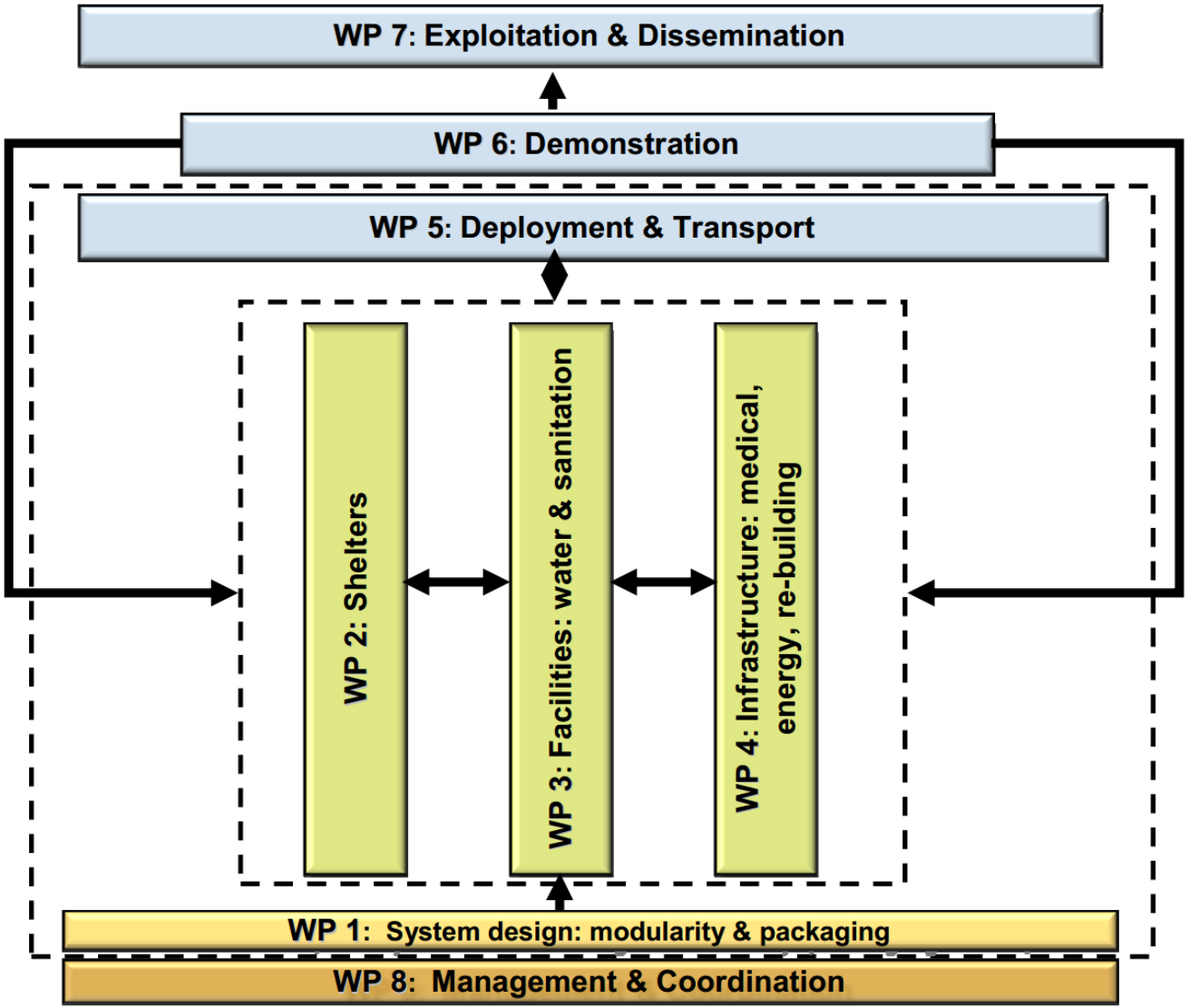
SYSTEMIC APPROACH → Rhizomatic design



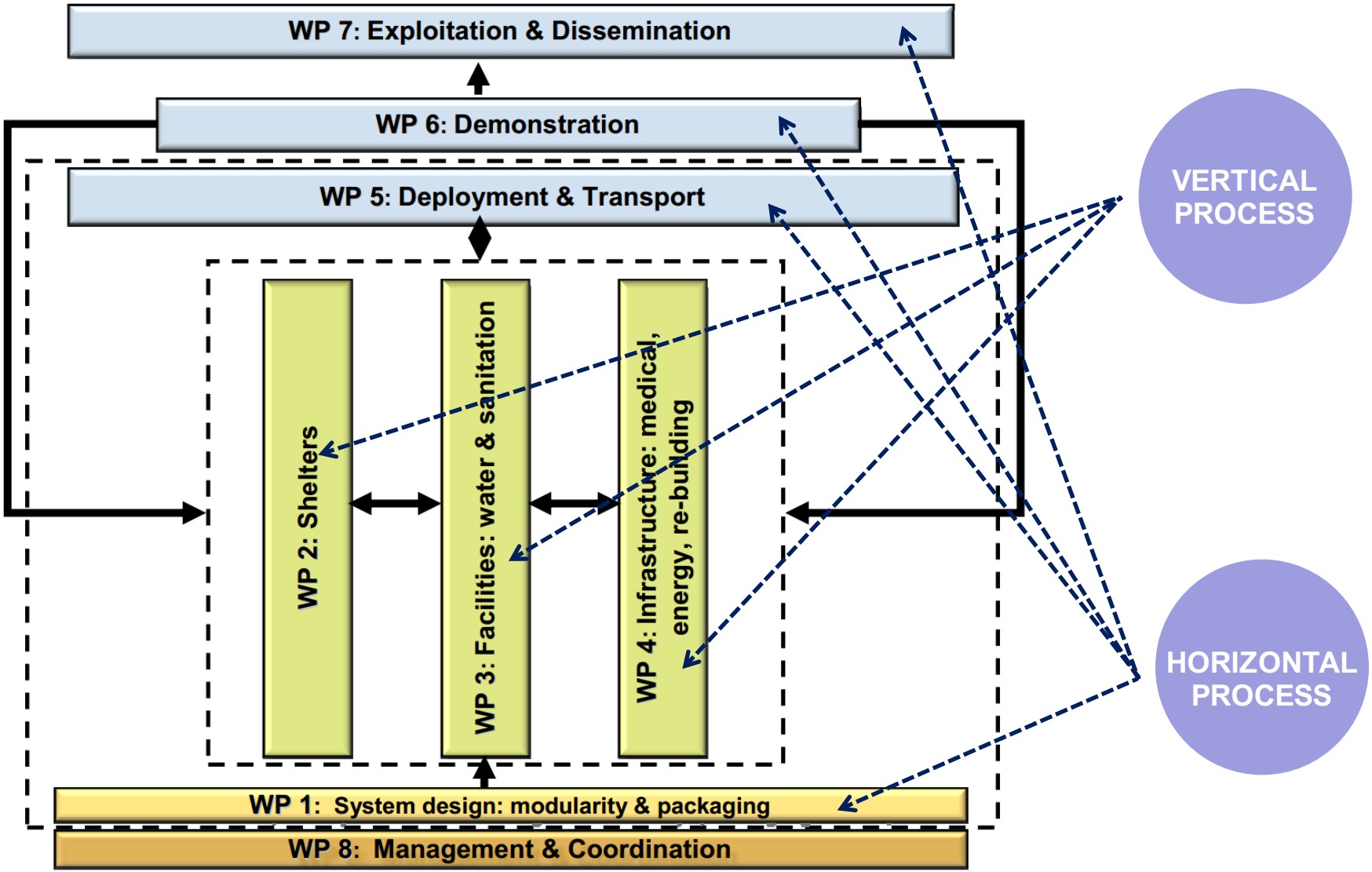
a. The relation between 'Design System' and 'Kit' in the Building Sector (Construction Products Directive - 89/106/EEC)
b. The S(P)EEDKITS System design and the seed concept

- Combination of components from different kits (for their adaptability to different climatic context, cultural and alternative means of transport);
- Re-usability of some components of the kit
- Usability for the subsequent emergency phases and the reconstruction phase.

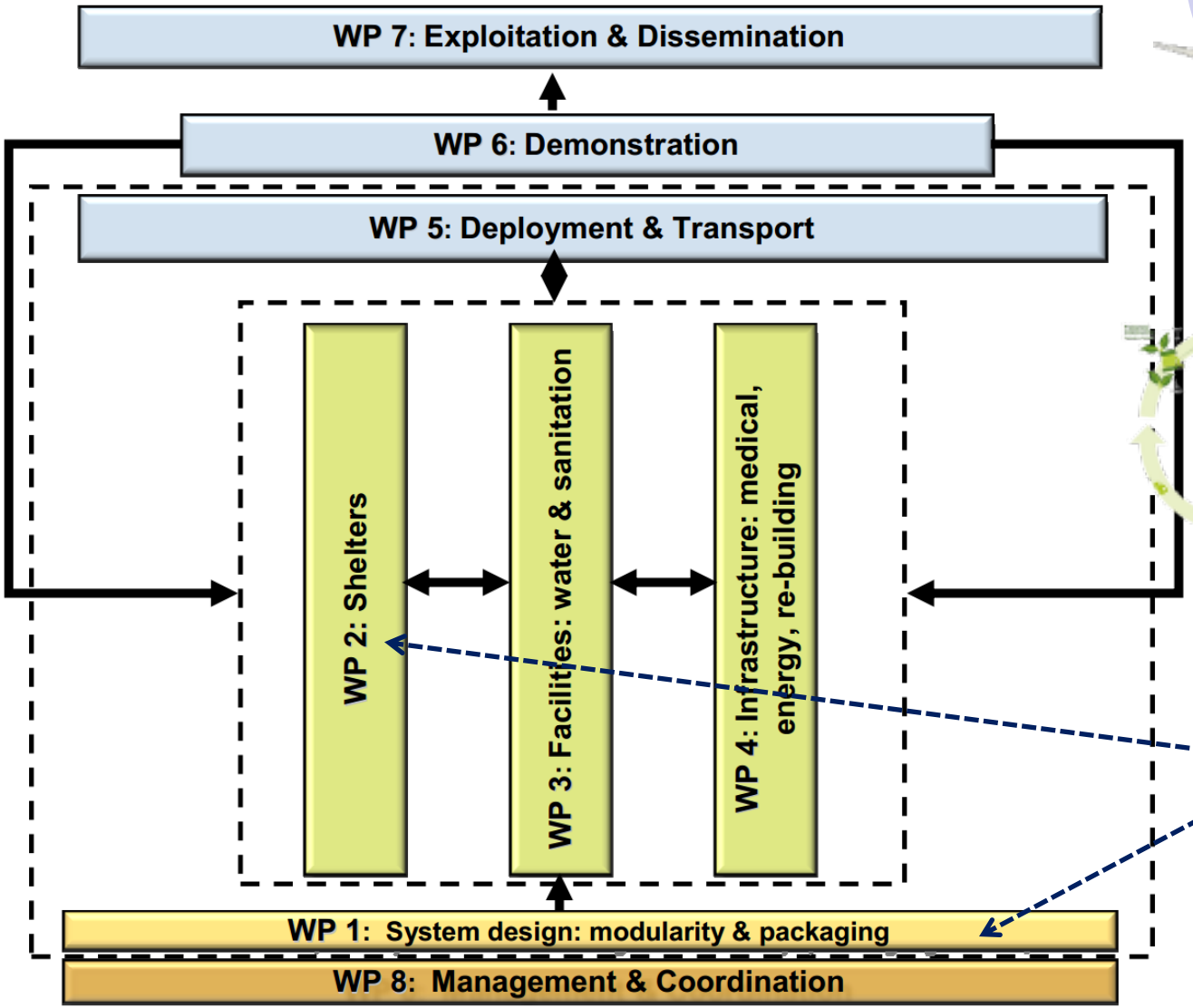
WPs STRUCTURE



WPs STRUCTURE → Vertical Vs. Horizontal Process

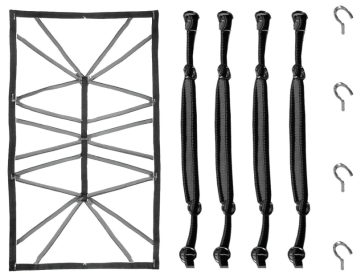


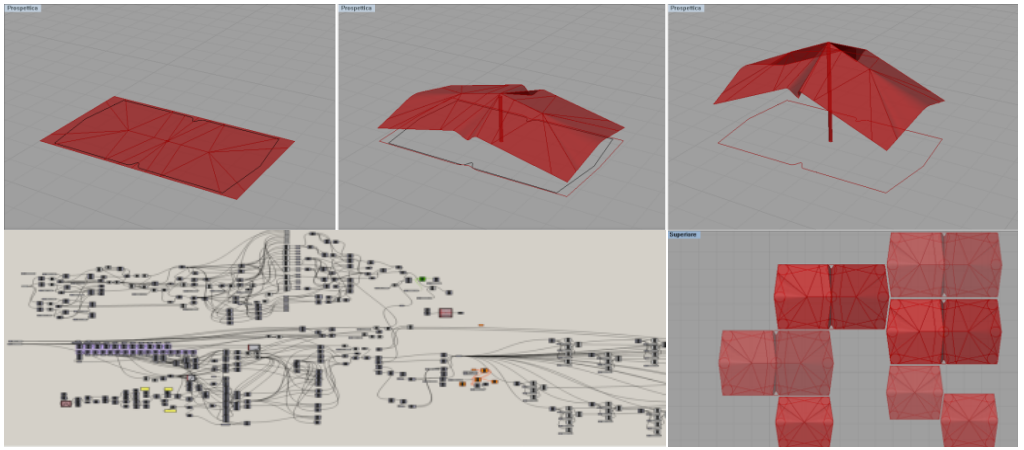
WPs STRUCTURE → POLIMI Research Tasks

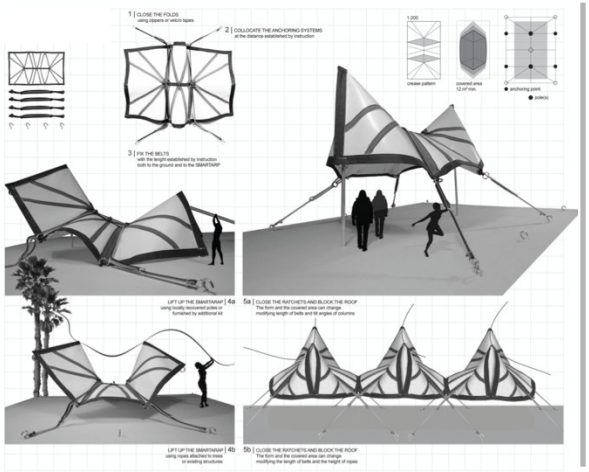


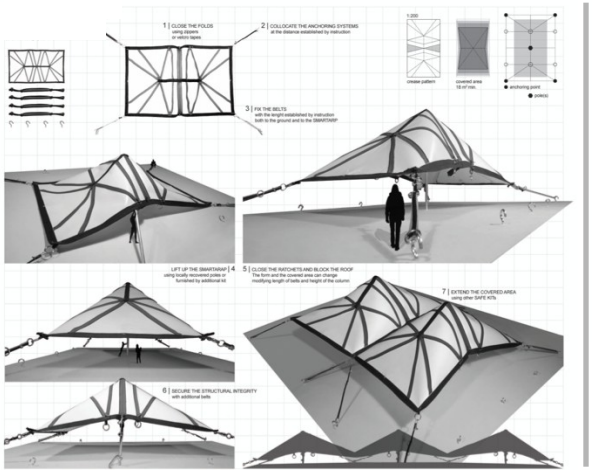
WORK PACKAGE 2→ Outcomes

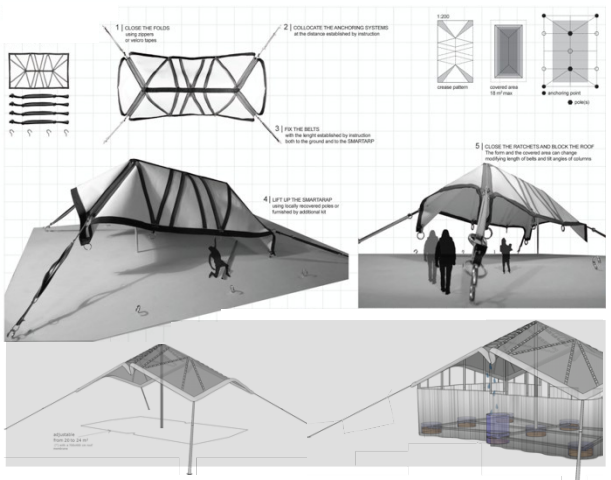
Shelter Type 1
Adaptable Roof

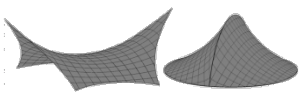


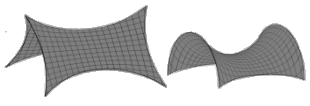


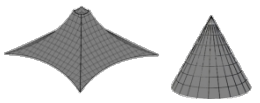








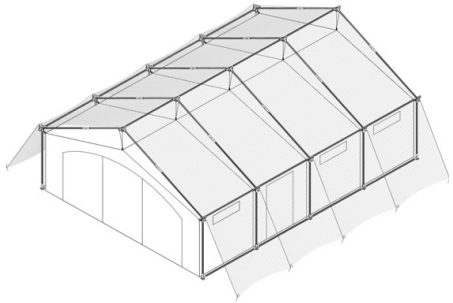


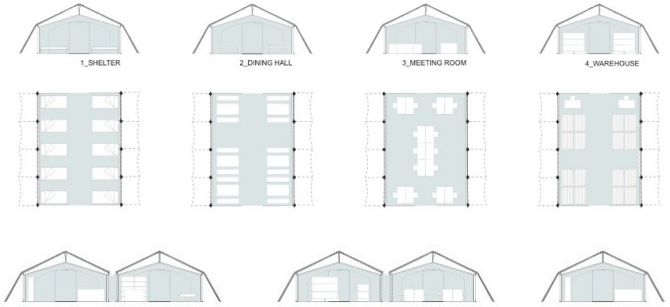


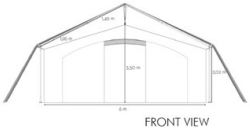
WORK PACKAGE 2→ Outcomes

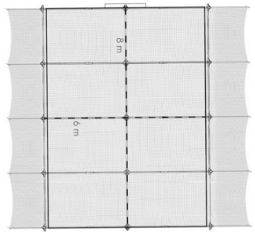
Shelter Type 2
Collective Tent

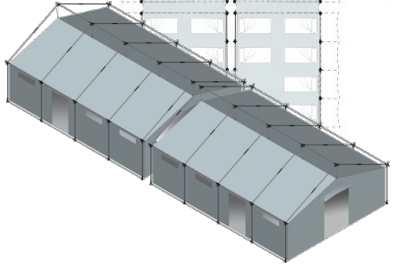
- Universal connectors
- Multiuse poles

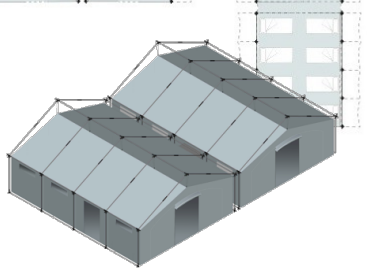












In collaboration with:

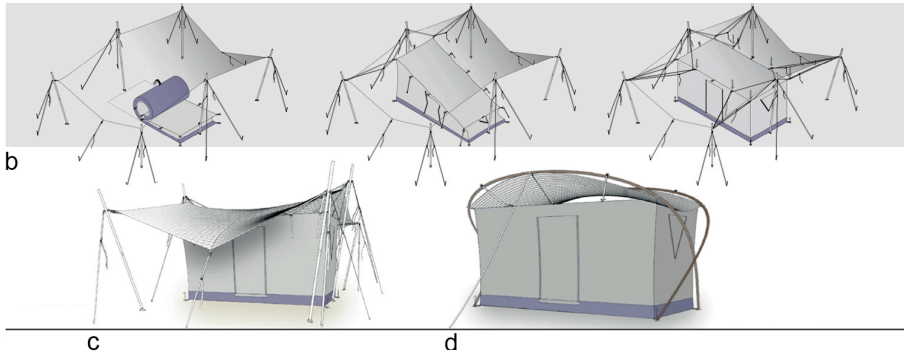
FERRINO

WORK PACKAGE 2→ Outcomes

Shelter Type 3/a
Family Unit

In collaboration with:

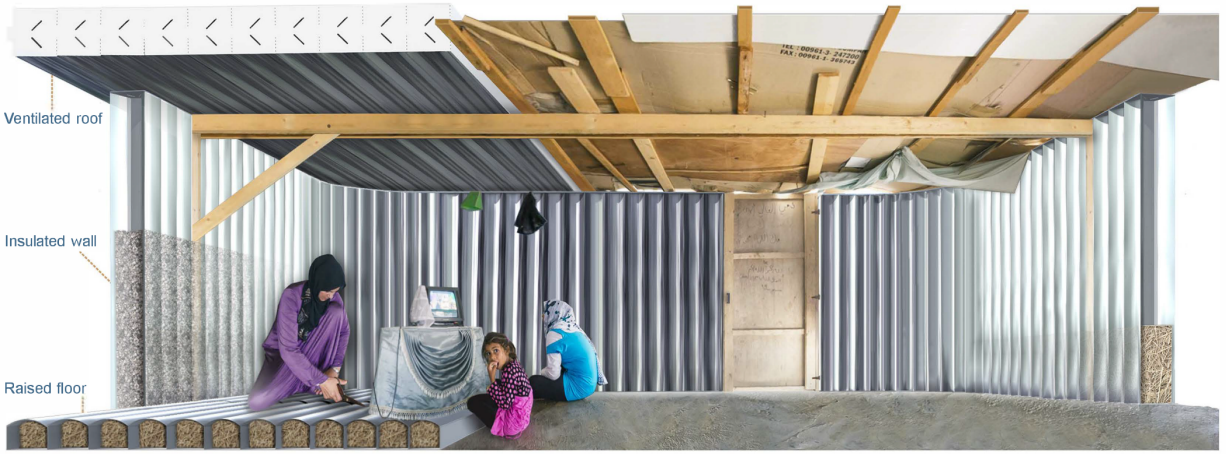
SIOEN

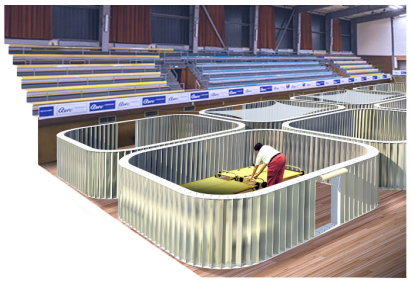


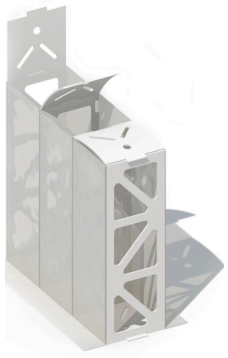
WORK PACKAGE 2→ Outcomes

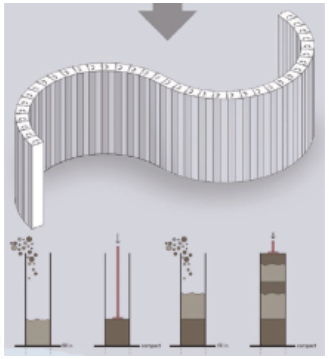
Shelter Type 3/b
Textile Wall

- Free-standing
- Fillable with locally available material









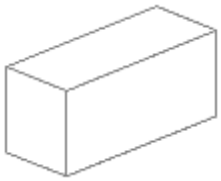
Field test in Burkina Faso, 2013

In collaboration with:

möllerwerke

WORK PACKAGE 1→ Transportation levels

container



pallet

bag

command centre

warehouse shelter

mobile recycling kit

medical infrastructure

safety house

family house

collective unit

add-on ict-kit

low tech sanitation unit

sanitation system with biogas generator

Drilling kit

Emergency kit

Water filtration

Logistic hub of NGO or Logistic Companies 1st level

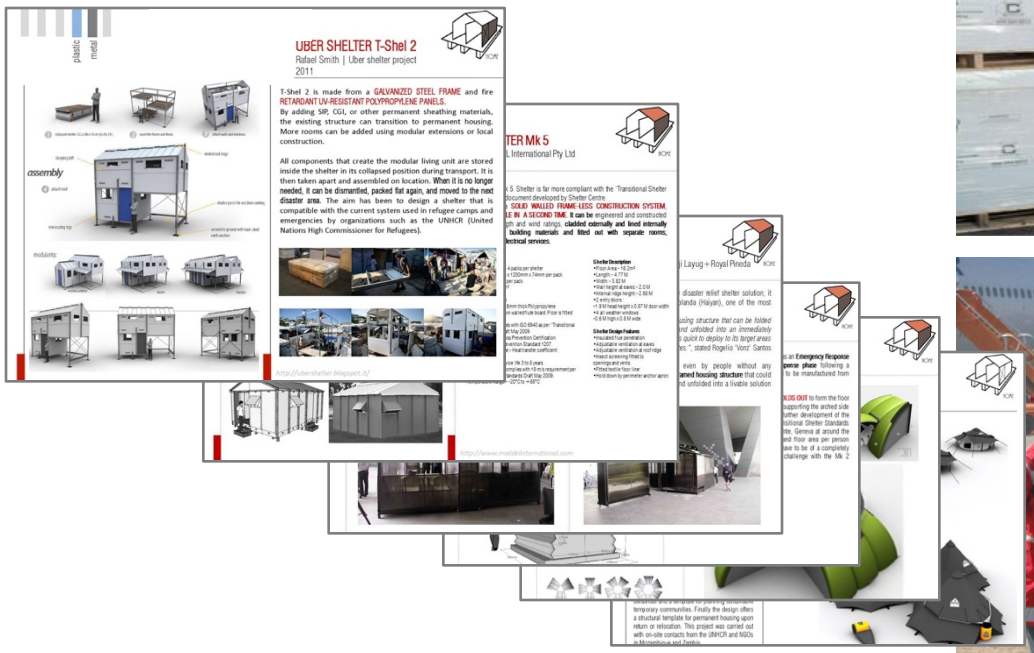
Warehouse Base camp + local warehouse 2nd (+3rd) levels

ICT-kit

Emergency Zone

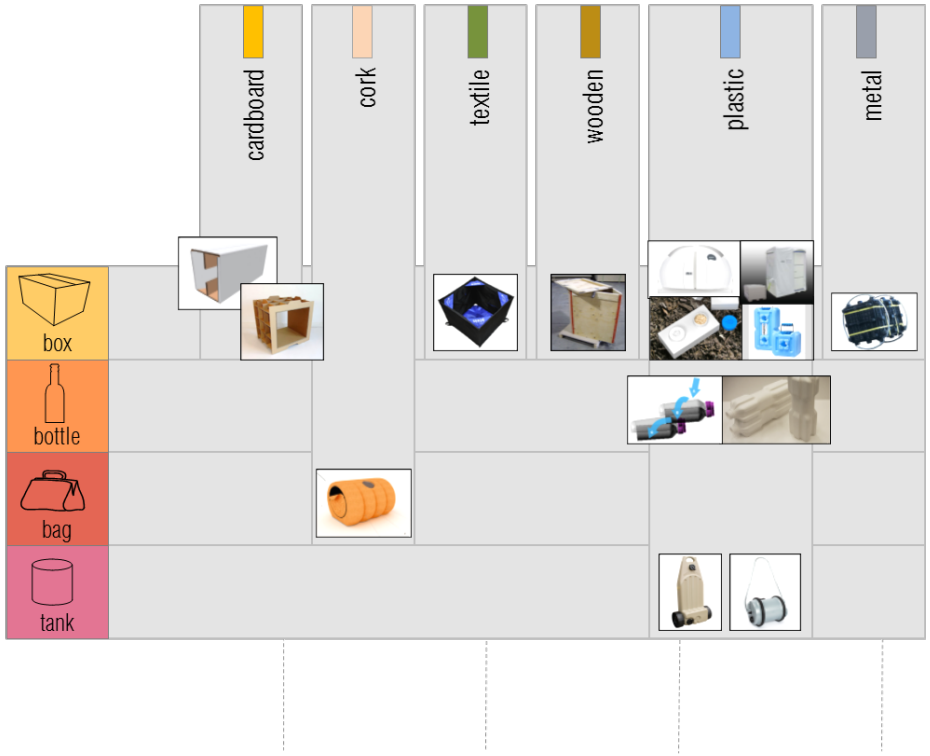
CONTAINER PALLET BAG BOX

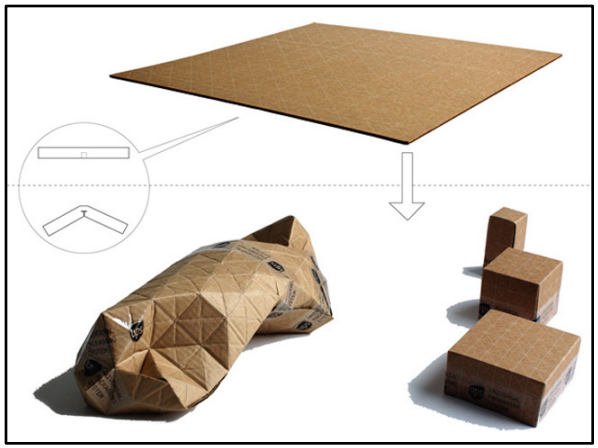
STATE OF THE ART→ Current NFIs Packaging



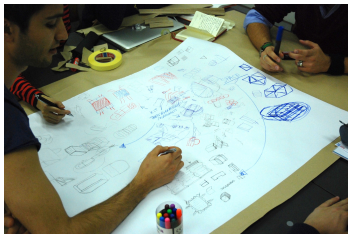
- Prefab shelter = Closed system
- Heavy packaging of NFIs
- Different Technical Specification for each NGO (*Multiplicity of kits* Vs. *Global disasters*)

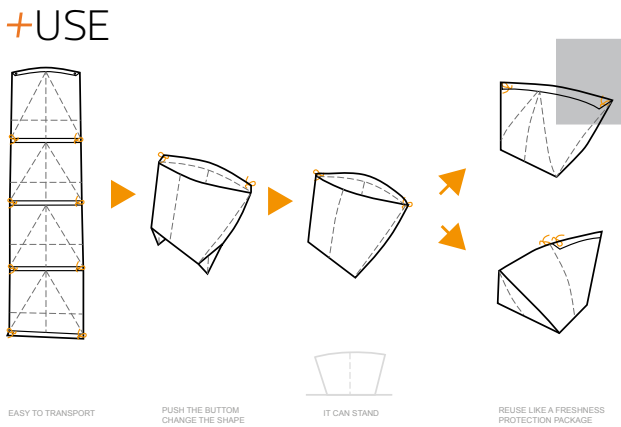
STATE OF THE ART→ Cross Cutting Analysis

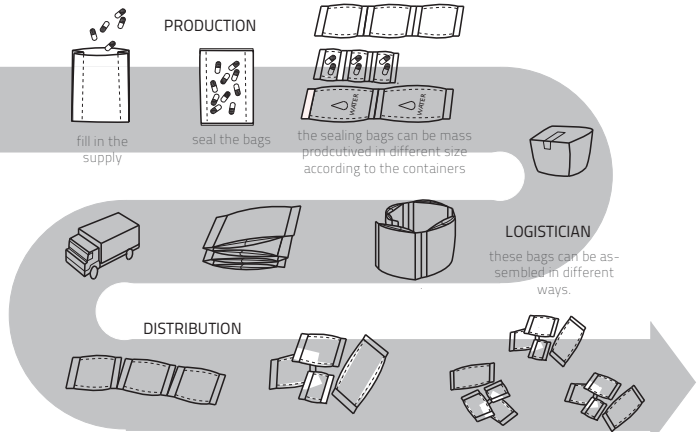


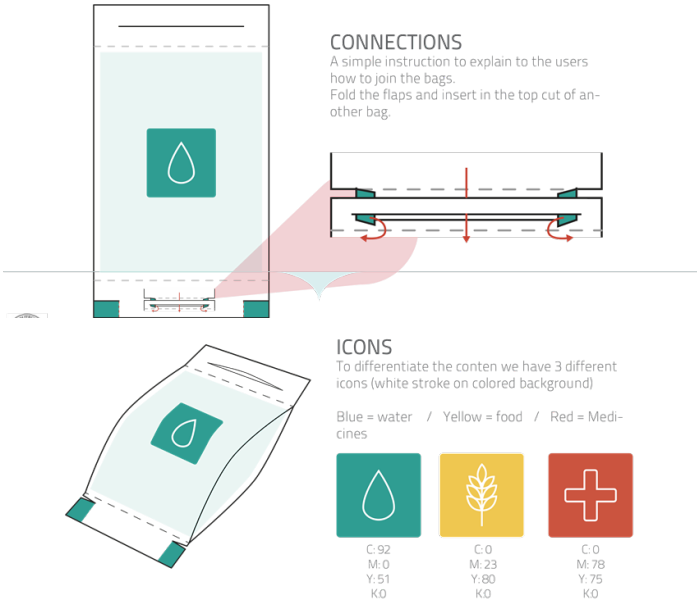


DESIGN STUDIO WORKSHOPS → Concept design



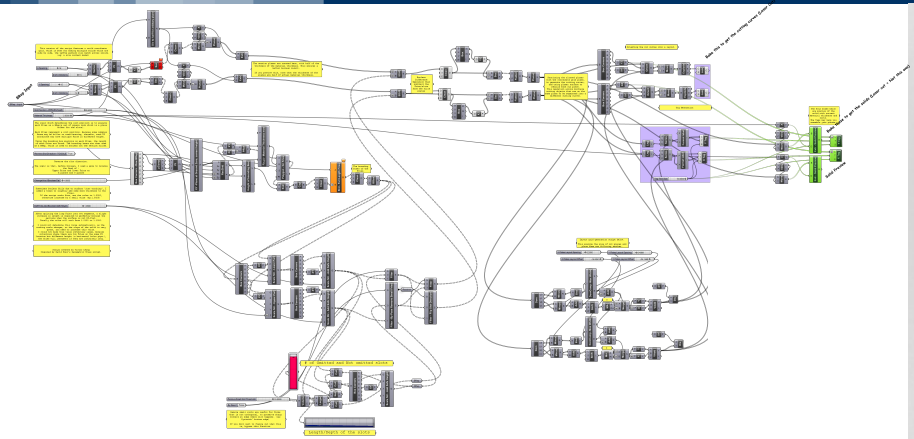


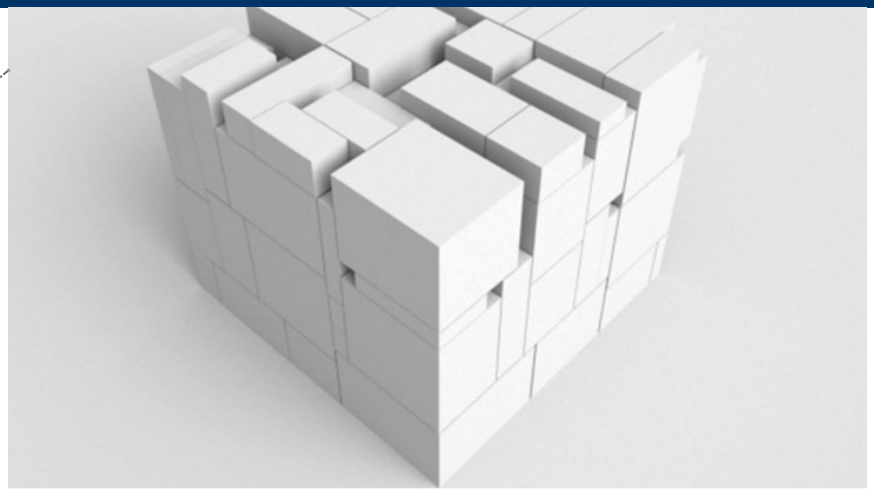




DESIGN STUDIO WORKSHOPS → Concept design

DESIGN STUDIO WORKSHOPS → Nesting design





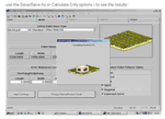
input data

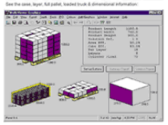
save data and calculate

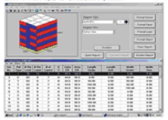
view options

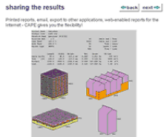
select a solution

customize and share results



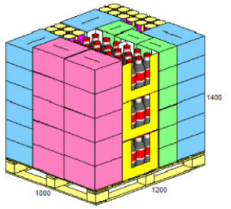


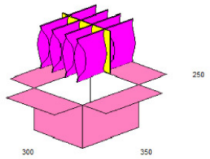


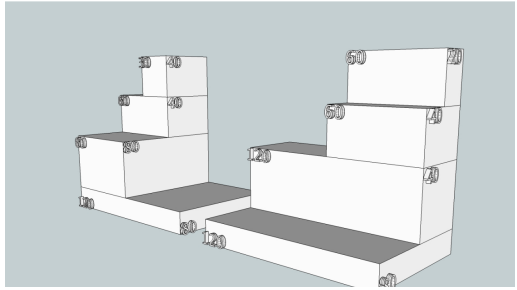


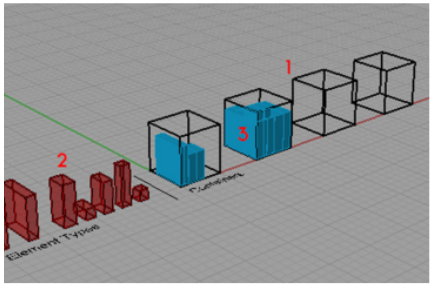
Product Name Mixed products, Column stacked for display
Product Code Multiple views available
Datafile Name supermarket213(25/03/2013)
Load Ref. 1 C
Cube Used 88.1 %
Pallet type UKSTD 70 Packages / Load

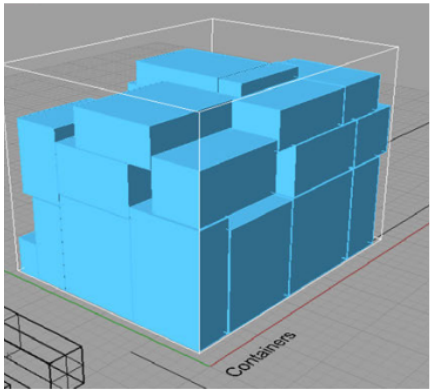
	Length	Width	Height	Net	Gross	Volume
Product	1200.0	1000.0	1250.0 mm	-	318.600 Kg	1.50 m^3
Load	1200.0	1000.0	1400.0 mm	318.600	343.600 Kg	1.68 m^3

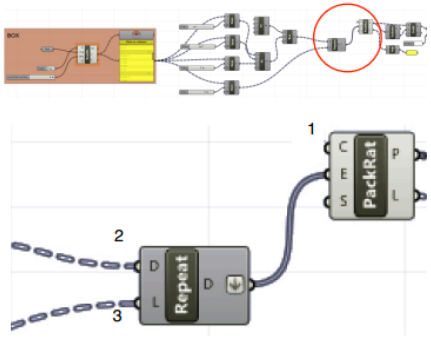


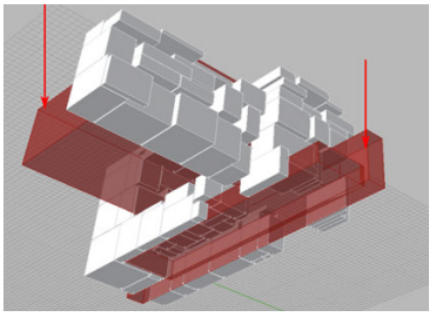




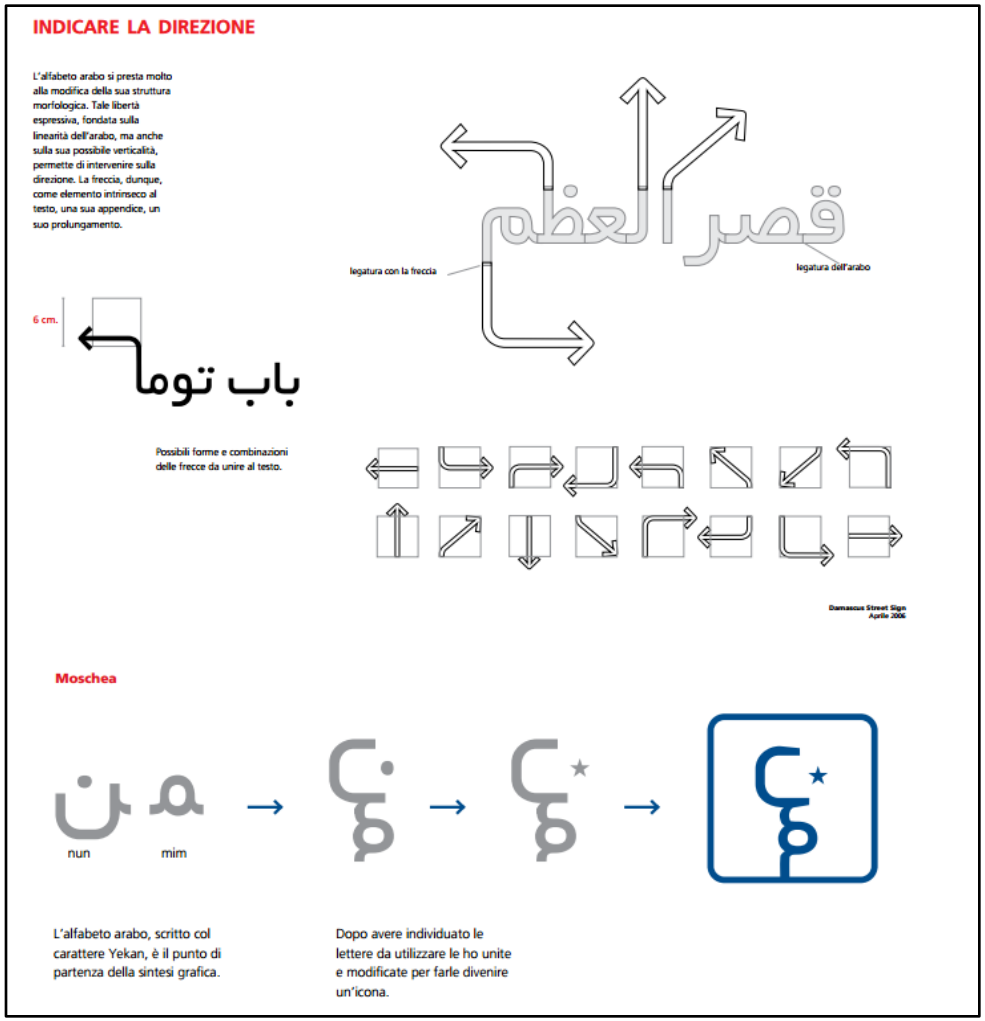




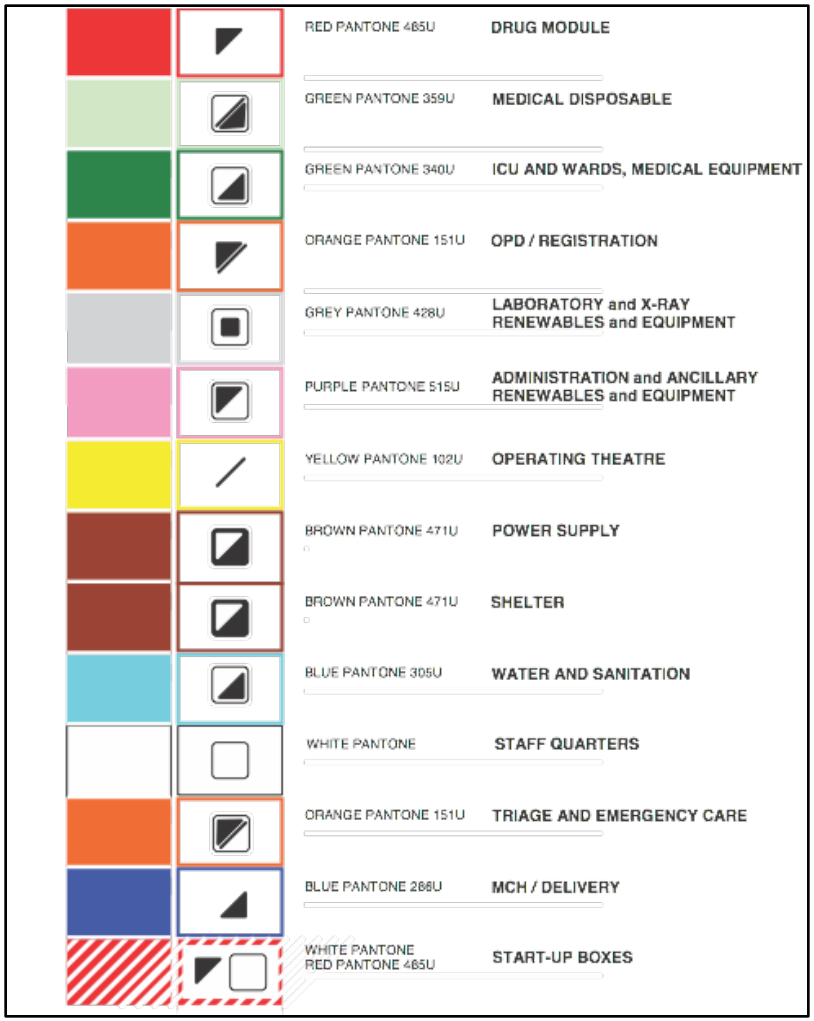




DESIGN STUDIO WORKSHOPS → Labelling design



Luigi Farrauto (2005), Street signs for the Damasco's medina

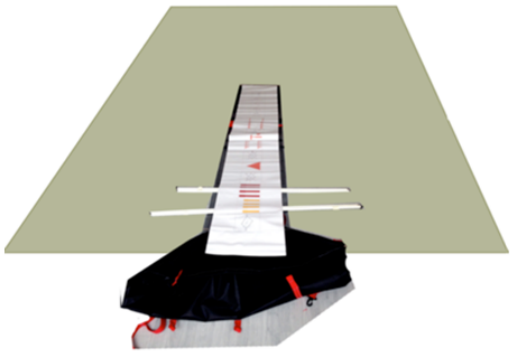


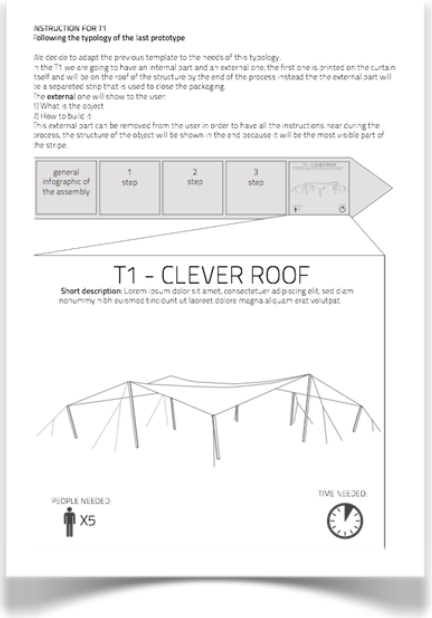
ColorADD symbols (www.coloradd.net)

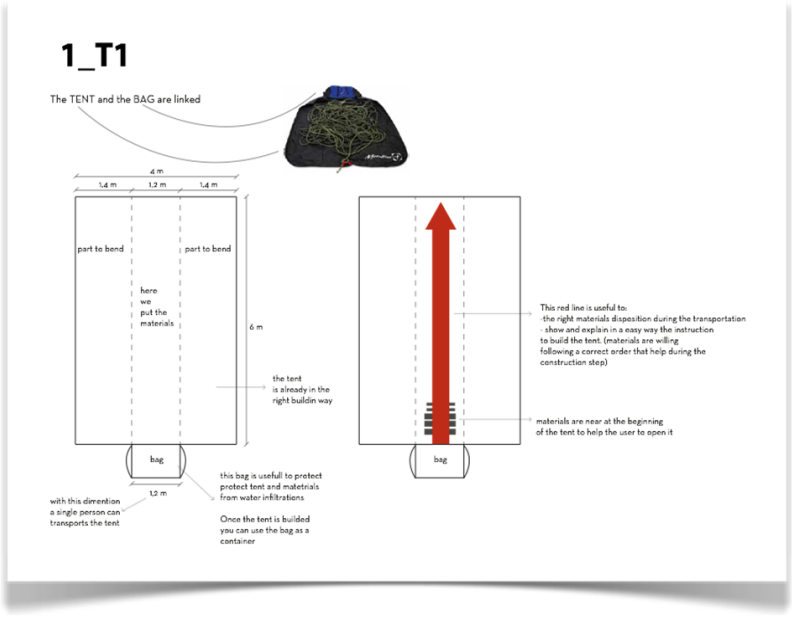
DESIGN STUDIO WORKSHOPS → Labelling design

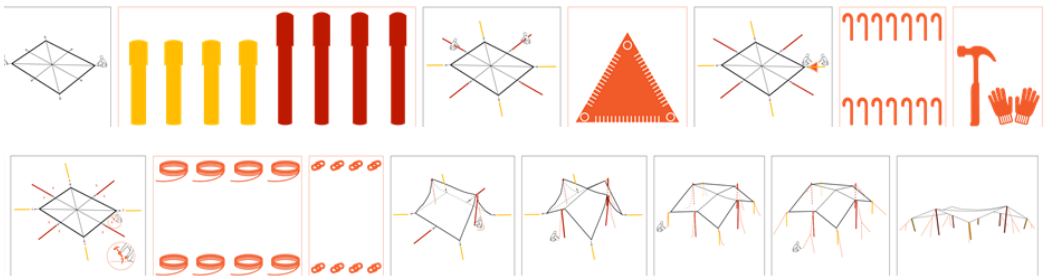
Field test in Senegal, 2015

DESIGN STUDIO WORKSHOPS → Instructions

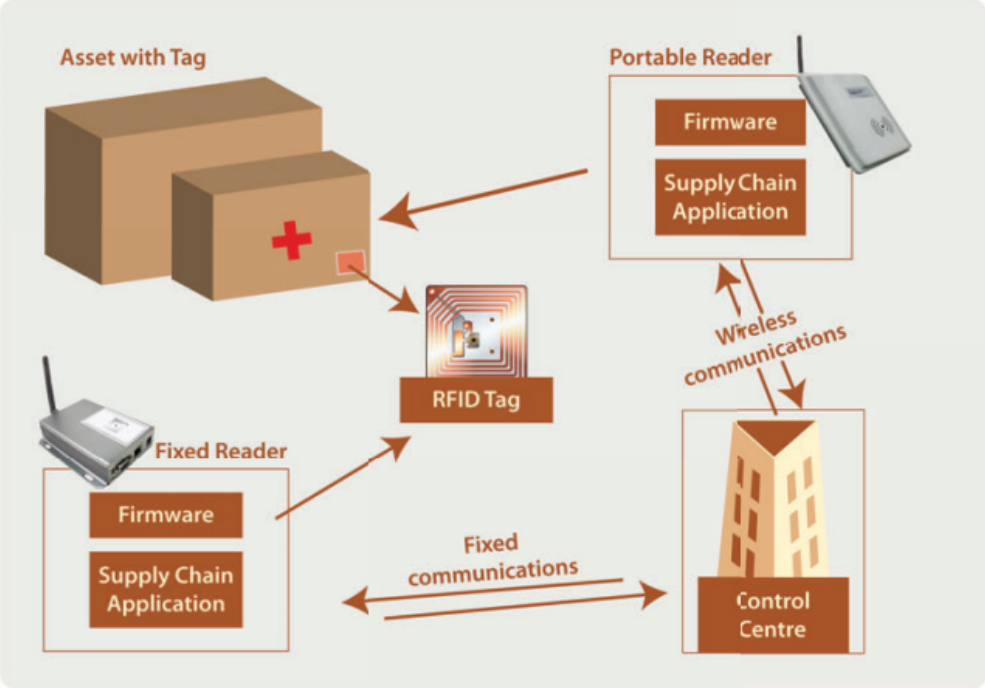








DESIGN STUDIO WORKSHOPS → RFId Technology



CONCLUSION

ACHIEVEMENTS

- set up of constant properties or elements (e.g. size, weight, content);
- set up of standard capacity transport (e.g. euro-container and, as sub-systems, euro-pallet and bag;
- set up of a widely accepted phasing method, according to the different phasing methodologies in use by humanitarian organizations;
- drafting of standard guidelines for the packaging of the emergency kits;
- drafting of a framework for instructions and assembly manuals in order to harmonize and simplify the process to different users.

OUTCOMES

- 1 PCT Patent
- 1 Commercial agreement with manufactuers and NGOs
- 12 Tents tested and used in a refugee camp in Senegal
- Publications in Scientific journals and Conference Proceedings
- Mentioned in Stories of Cooperation at POLIMI 2011-2016

THANK YOU FOR THE ATTENTION

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