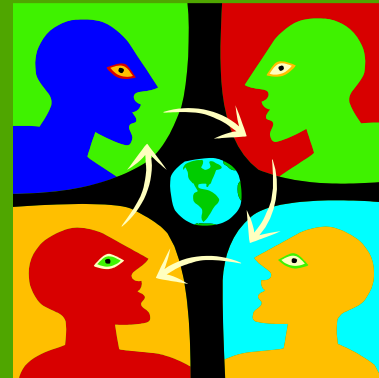
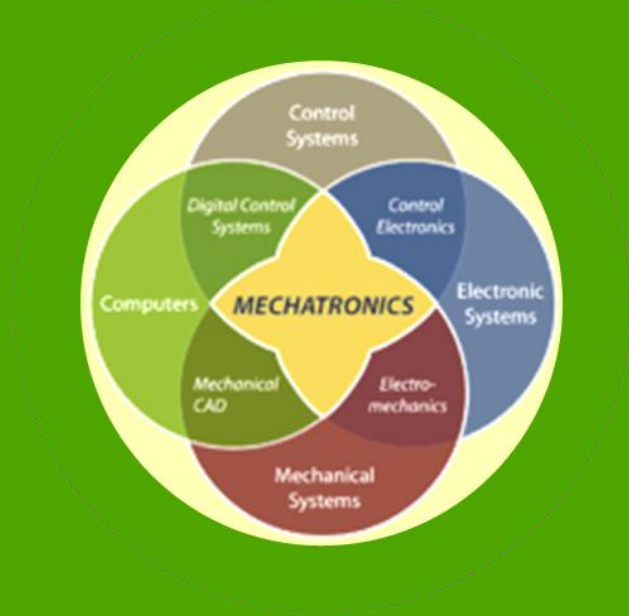
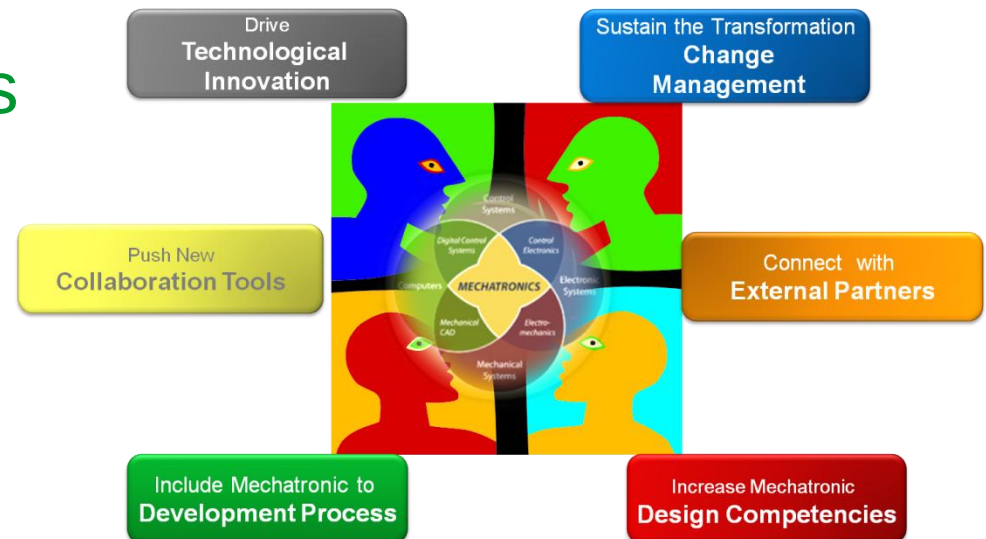
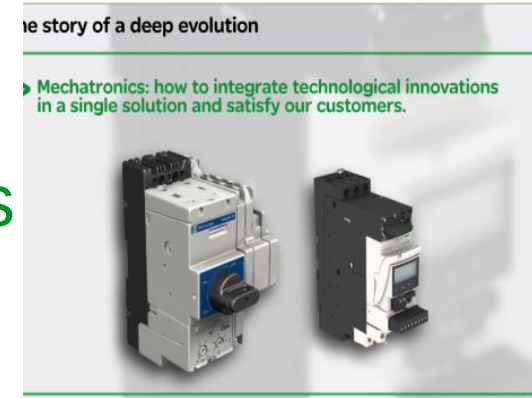


Un exemple d'approche mécatronique pour un design de disjoncteur moteur intégré & organisation du processus de changements



Plan de la présentation

- Schneider Electric / Power Business
- Vidéo : Exemple projet
- 1 initiative en 6 axes

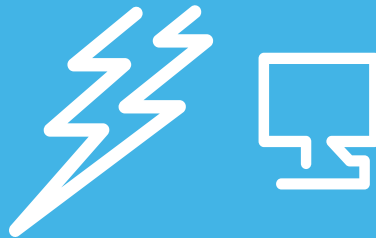


175 ans d'histoire

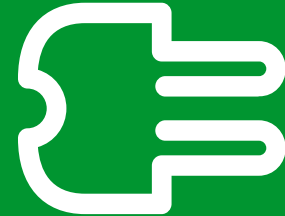
Industrie de
l'acier



Power & Control



Gestion de
l'énergie



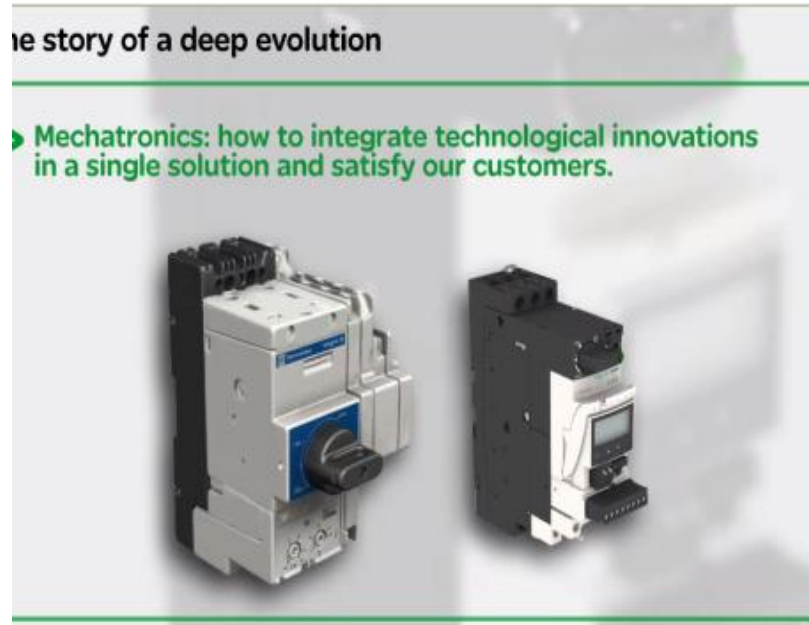
19^{ème} siècle

20^{ème} siècle

21^{ème} siècle

Une histoire d'un Design mécatronique chez Schneider Electric

- Vidéo du projet



Innovation : 60 brevets

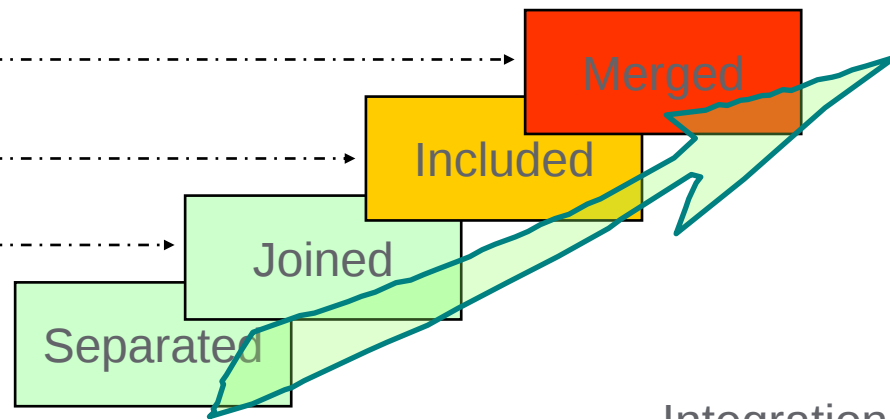
	Integral-32	Tesys-U	Reduction
Volume (cm ³)	1939	694	- 65% *
Weight (g)	2343	913	- 62% *
Amount of parts	485	187	- 61% *

* High quality level preserved

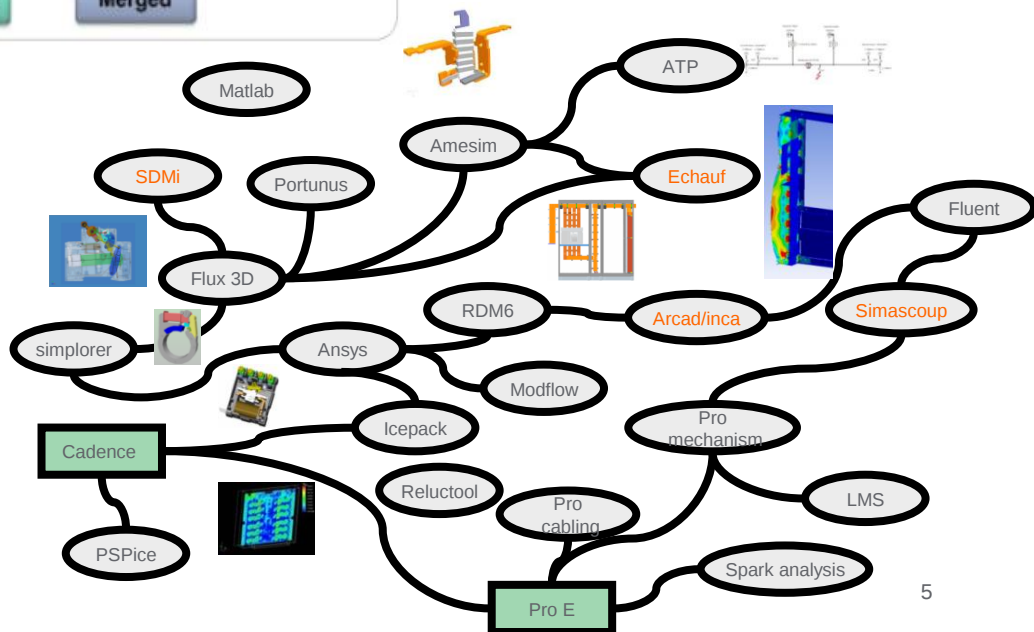
Où en sommes nous ?

maturity level ↑

Ultimate : One tool for all disciplines
Advanced : Automatic datas links
Basic : Datas exchange with standard formats
Manual : Manual communication between tools



Integration level →



Converger et s'approprier une définition, un domaine,...

Multiples contributeurs thermique

Compacité
Optimisation 3D de l'intégration des cartes

Une méca, des **capteurs**, un algo de contrôle

Contraintes **CEM** fortes (intégration puissance/contrôle)

Criticité de la **connectique**

Multi-techno:
HW, magnéti-
Sme, mécanisme, FW



Des Watts

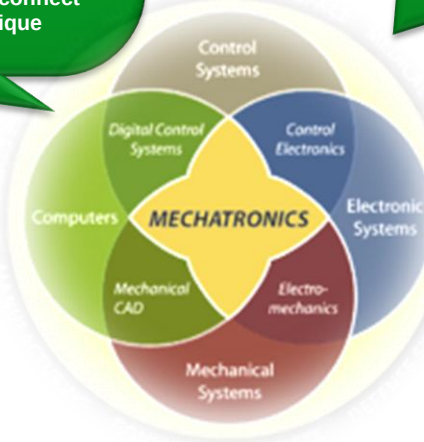
De la Robustesse

Des Nouvelles fonctions

Des € en moins

Mécanique

Electronique

System Engineering

Mechatronic

Design
ELM, ELN, FW

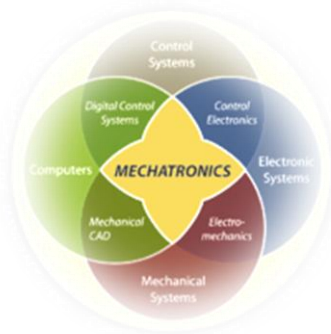
- 1- Define the system ?
- 2- Define the needs
- 3- Product/system specification
- 4- Functional architecture
- 5- Physical architecture
- 6- Technological Architecture
- 7- Implementation



extracts from AFNOR E01-10 Standard

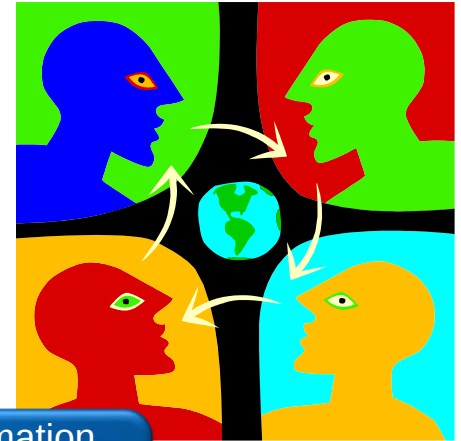
	Intégration Fonctionnelle	Intégration Physique
Domaines d'activités	•Mécanisme, actionneurs •Electronique •Magnetisme •Logiciel, algorithme •Réseau électrique	•Enveloppe méca •Circuit Imprimé •Cablage, connect •CEM, Isolation •Circuit Magnétique •Thermique
Conception	Modélisation et Simulation du produit (système mécatronique)	Conception collaborative partage des contraintes environnement
Type d'outils	Simulation et modélisation multi-physique	Echanges de données entre les logiciels CAO

Favoriser une transformation dans notre design et pour nos designers



+Intégration
+Intelligence

+Converger
+Accélérer



Drive
**Technological
Innovation**

Sustain the Transformation
**Change
Management**

Push New
Collaboration Tools

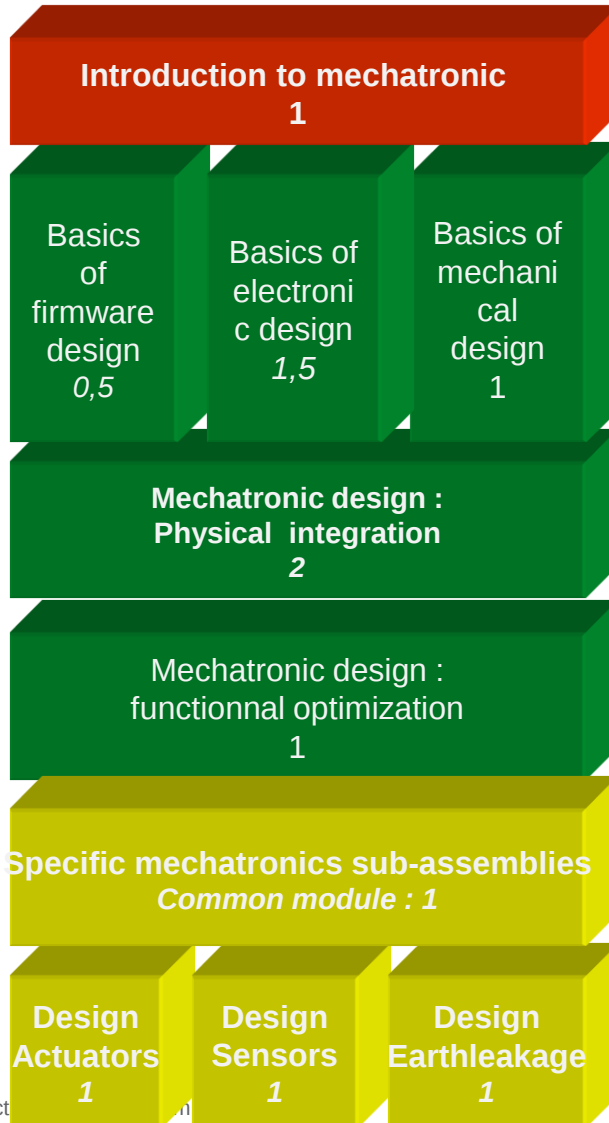
Connect with
External Partners

Include Mechatronic to
Development Process

Increase Mechatronic
Design Competencies

1 initiative en 6 axes de transformation

Increase Mechatronic Design Competencies



Step 1 :

Approche générale et Culturelle

Step 2 :

Connaissances multi technologiques

Débuter par l'integration mécatronique

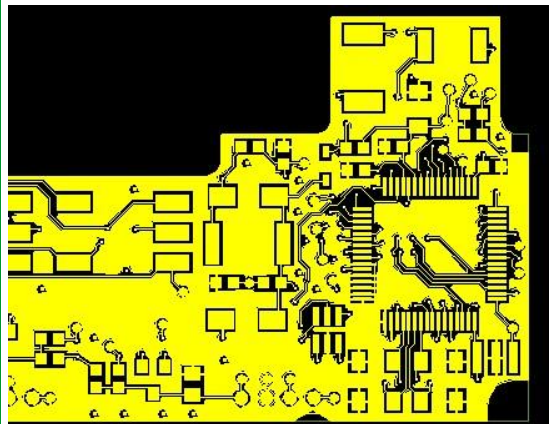
Step 3 :

Approfondir le besoins et possibilités du design mécatronique à travers des spécifications de sous ensembles particuliers

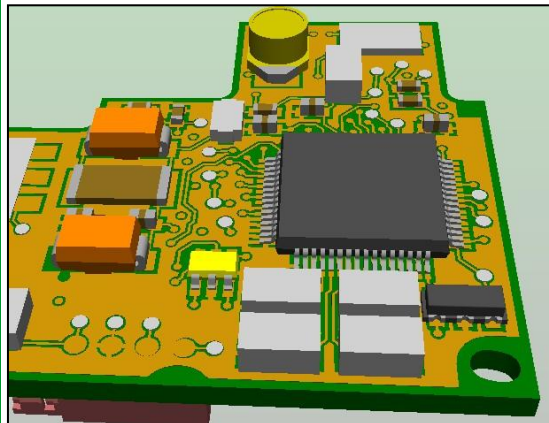
Push New Collaboration Tools

ECAD-MCAD automatic Link

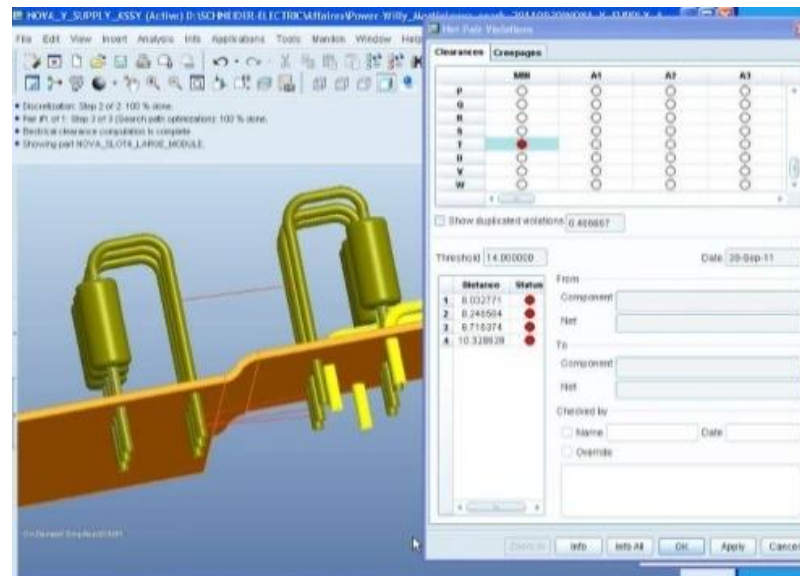
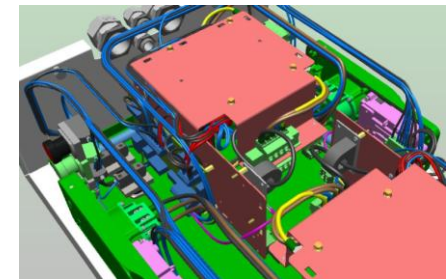
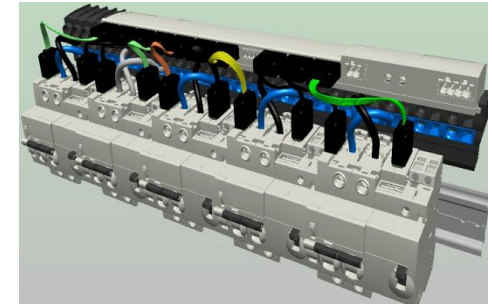
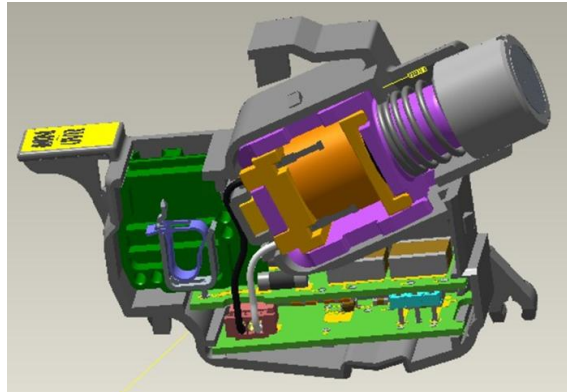
- Transfer Layout design
- use new IDF+ format



CADENCE
Workspace



ProE
Workspace

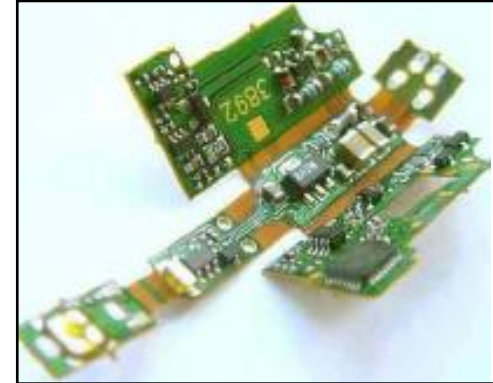


3D-MID (Molded Interconnect Devices)

LDS Process (Laser Direct Structuring)



PCB Flex →
Solution
intégration
physique

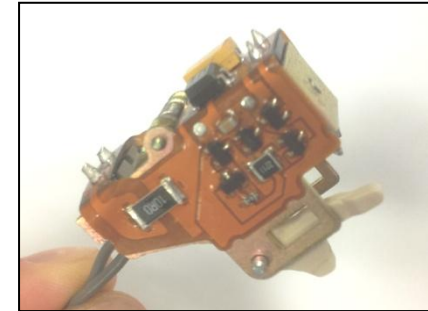


#1 → OverMolding

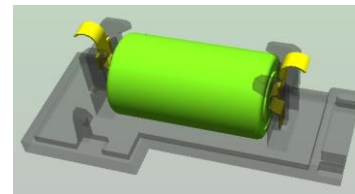
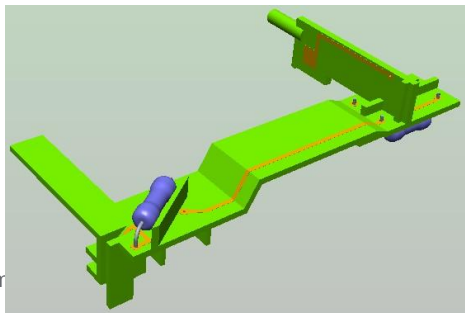
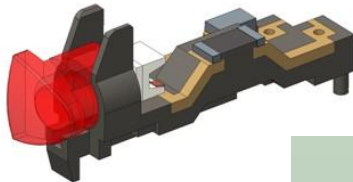
#2 → 2-Shot injection molding

#3 → Laser Direct Structuring (LDS)

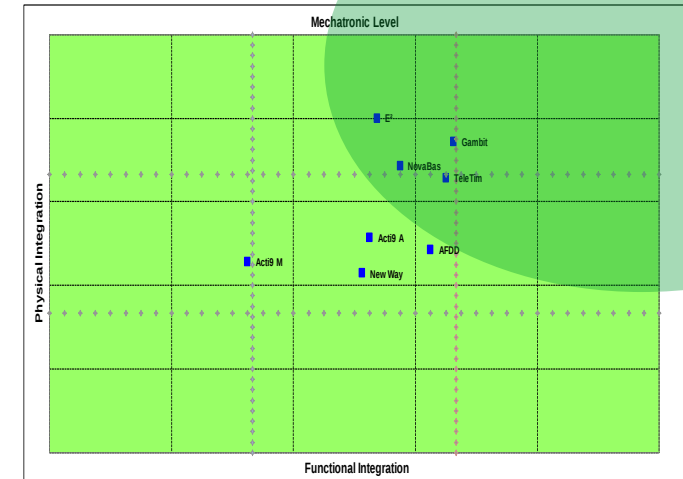
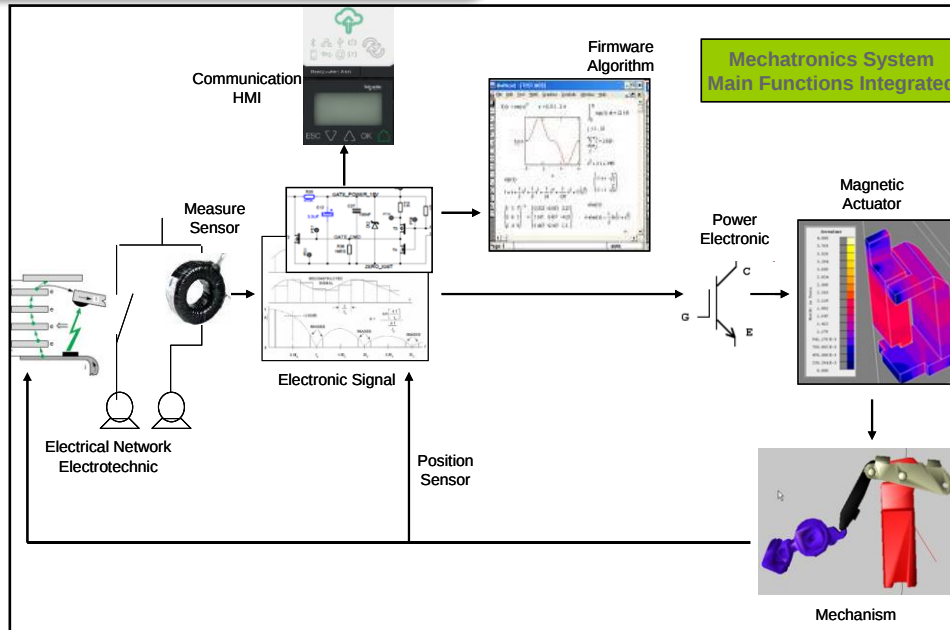
#4 → Laser Subtractive Structuring (LSS)



Simple face + composants :
>Fixation par autocollant
>Raidisseur en local vers les
soudures fil

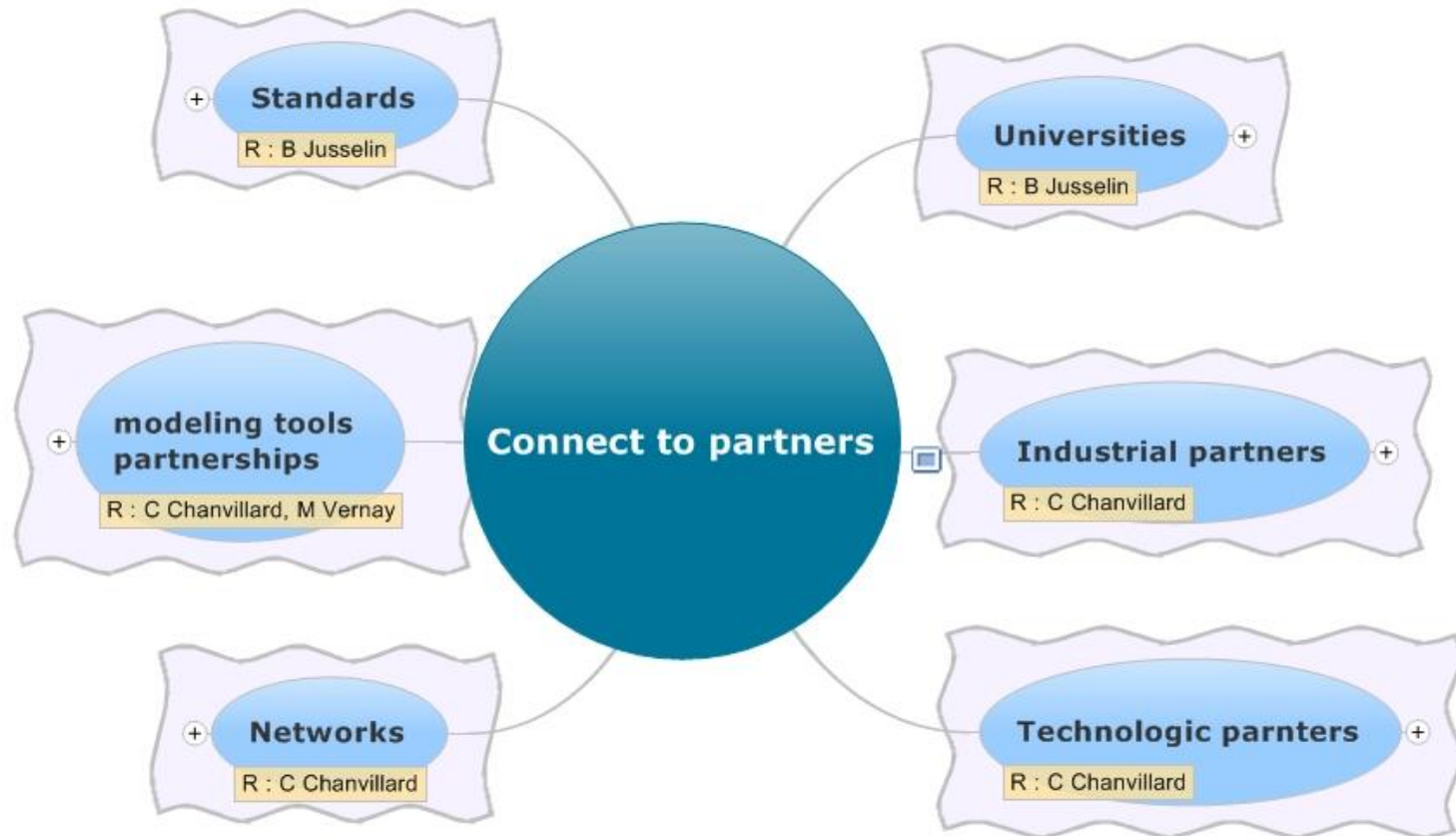


Include Mechatronic to Development Process



Functional Integration		Electrical Network Electrotechnic	Measure/Position Sensor	Electronic Signal	Communication HMI	Firmware Algorithm	Power Electronic	Actuator Magnetic	Mechanism	Physical Integration		3D integration	Wiring	EMC Insulation	Thermal	Mechatronic Level	
51%	med	1	3	2	2	2	1	0	0	74%	high	5	3	2	1	62%	med
53%	med	1	0	1	1	1	1	1	1	51%	med	3	2	2	2	52%	med
33%	low	0	0	1	2	2	1	0	0	46%	med	3	1	2	1	39%	med
61%	med	1	1	1	1	2	1	1	1	49%	med	3	2	1	2	55%	med
69%	high	2	2	2	2	2	1	1	3	77%	high	5	2	2	3	73%	high
51%	med	1	1	3	2	2	2	0	0	43%	med	2	1	3	3	47%	med
58%	med	3	3	2	3	3	2	0	0	69%	high	4	3	3	2	63%	med

Connect with External Partners



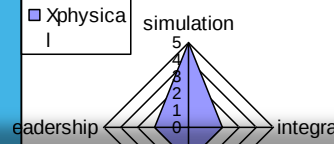
Increase Mechatronic Design Competencies



Mechatronic Profile #1

Xphysic & simulation specialist

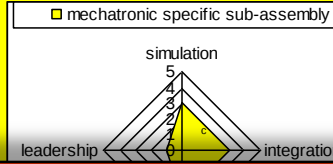
- Master functional simulation
- Able to help (math)
- help



Mechatronic Profile #2

Specific mechatronic sub-assembly

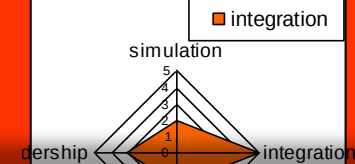
- Master functional simulation
- Able to help (math)
- help



Mechatronic Profile #3

Integration designer

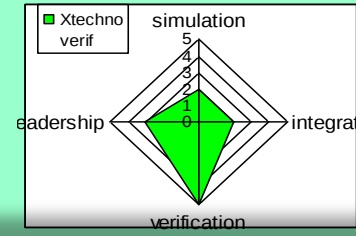
- Master functional simulation
- Able to help (math)
- help



Mechatronic Profile #4

Xtechno verification leader

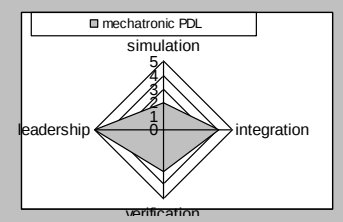
- Master functional simulation
- Able to help (math)
- help



Mechatronic Profile #5

Mechatronic PDL or PredDev leader or PEP product range leader

- Master functional simulation
- Able to help (math)
- help

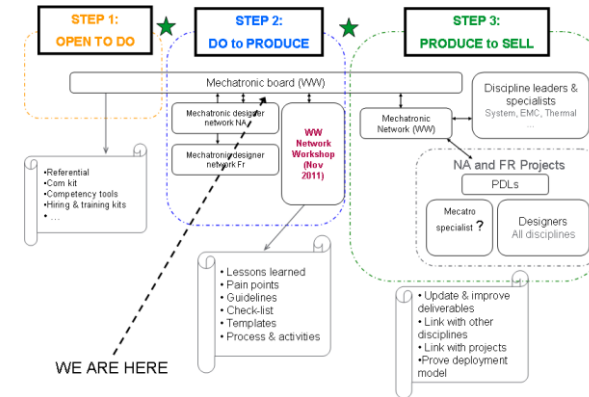


Sustain the Transformation

Change Management

Création d'une Initiative mécatronique avec :

- > un Board mondial composé de managers et experts
- > des Réseaux locaux de concepteurs (EUR, IND NA, CH)



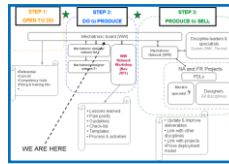
Garant des livrables

Développe la Communication

Via Ressource managers
Via Project managers
Via Top management

« Tool kit for managers »

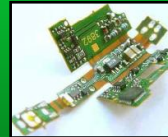
Applique et fait appliquer la stratégie Design (yc WW)



1 initiative

2 types d'intégration

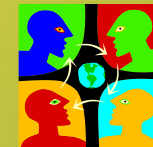
3 D



4 Domaines technologiques



5 profils/designers mécatroniciens



6 axes de transformation



Merci de votre Attention