J-TECH@POLITO

Advanced Joining Technology at POLITO

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ADVANCED JOINING TECHNOLOGIES
J-TECH @ POLITO

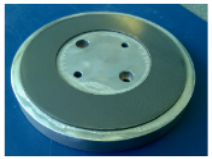
J-TECH@POLITO - Advanced Joining Technology at POLITO

THE IDEA

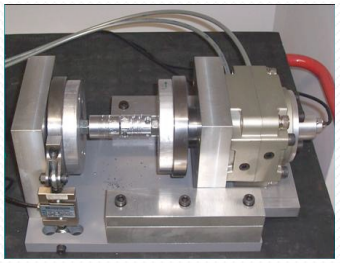
DIMEAS

- Design and testing of assemblies subassemblies and components
- Modeling and structural optimization
- Non-destructive testing

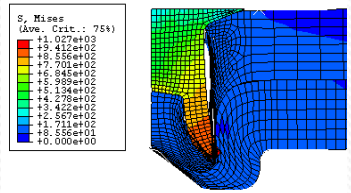
DISAT



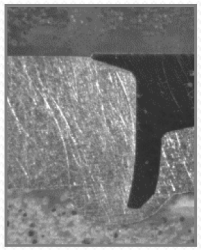
- Materials design, characterization and optimization
- Joining materials design, characterization and optimization



To establish a top-class centre on advanced joining technology.



DIGEP



- Process design and optimization
- Monitoring and control procedures and algorithms
- Process industrialization
- Cost and sustainability

COMPANIES

element
Consiglio Nazionale delle Ricerche
Henkel
OAK RIDGE National Laboratory
TITANIUM BRAZING, INC.
5977 Coventry Cross Ln., Hilliard, OH 43026
18678 Cranwood Parkway, Cleveland, OH 44128
Ph: (614) 886-7519, Fax: (614) 540-7493
CRF CENTRO RICERCHE FIAT
IPPT PAN
esi get it right®
Fraunhofer
Listemann AG
NASA
AIRBUS
KMM.VIN
Queen Mary University of London
ENDURANCE
MT AEROSPACE

Expressions of interest

- Industry
- Public and private research centres
- Academia

examples →

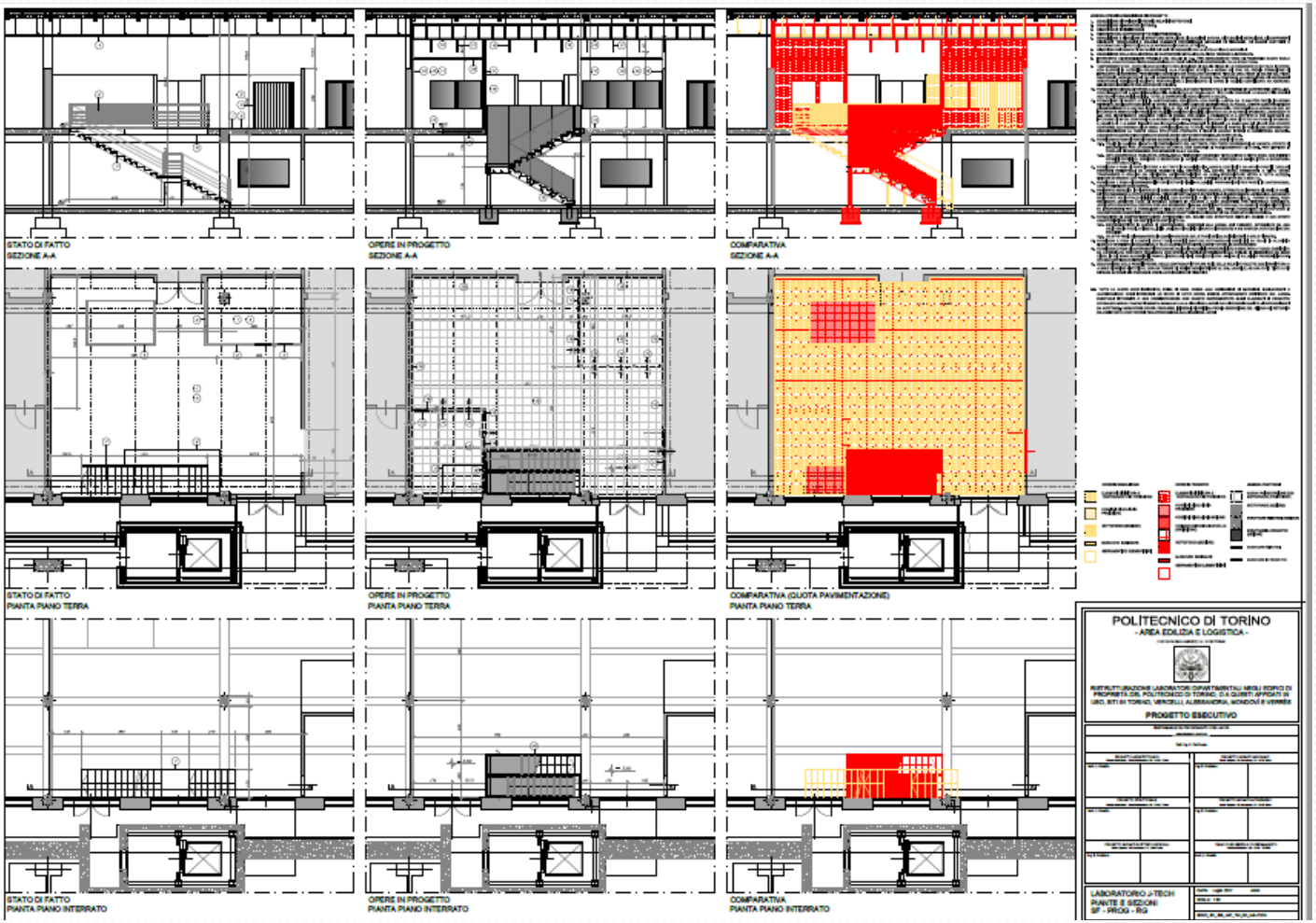
	Ready to cooperate with J-TECH on
Company	General Electric — New brazes, mechanical tests, custom training
	AIRBUS — Modeling, design, non-destructive tests
	Henkel — Adhesive joining
	TITANIUM BRAZING, INC. — Design, manufacture and testing of multilayer, lightweight structures brazed from dissimilar metals layers or metal-ceramic layers
	MT AEROSPACE — FRP joining, non-destructive test
	Listemann AG — New brazing alloys, non-destructive tests
	element — Adhesive joining, modelling, non-destructive testing
	esi — Dissimilar materials joining/welding
	ENDURANCE — Non-destructive techniques
Research centre	NASA — Joining silicon carbide-based materials, non-destructive testing
	OAK RIDGE National Laboratory — Evaluation of joining and integration technologies
	Queen Mary University of London — SPS joining, joining of thermos-electrics of CMC
	Fraunhofer — Development and technology transfer for similar and dissimilar materials joined components
	CRF CENTRO RICERCHE FIAT — Non-destructive testing , joining dissimilar materials
	IPPT PAN — Joining dissimilar materials, micro-CT, examination, micro-mechanical testing
	Consiglio Nazionale delle Ricerche — Interfacial reactions, wettability studies
	KMM.VIN — Modeling, joining dissimilar materials

J-TECH@POLITO new facilities

- **Custom-built facility** for **Non Destructive Testing (NDT)** of **joined components** and **materials,** based on X-ray tomography
- **Multipurpose joining & testing facility** including **heating stage/mechanical testing** equipment operating in **vacuum, inert** and **reactive atmosphere, temperature** range **-80;+1450 °C**
- **Friction Stir Welding station**
- **Laser Nd-YAG head** to be applied on an existing 6 axis anthropomorphic robot, thermographic system for inspection
- *Thermography analysis (*)*
- *Non destructive elastic modulus vs T (*)*
- *Torsion-tensile tests (*)*

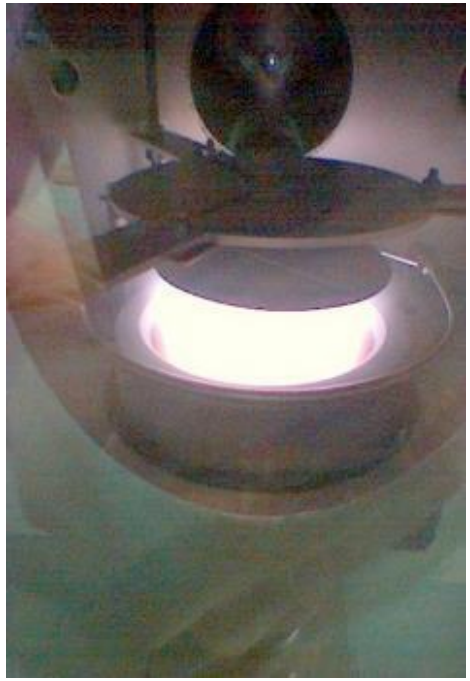
- *(*) co-funded by Piedmont Regional Project INFRA-P*

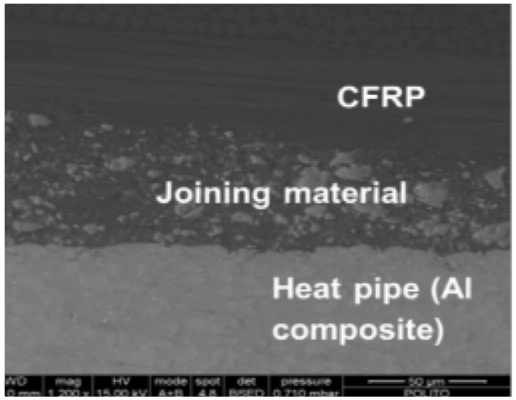
J-TECH@POLITO: work in progress….



Disponibile da ora:

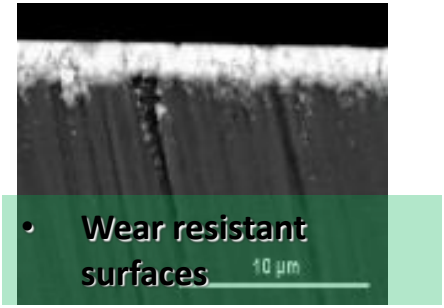
- Gruppo composto da 9 docenti, 30+ dottorandi e assegnisti di ricerca
- 350 m^2 di laboratori attrezzati per preparazione e caratterizzazione dei materiali
  (http://www.composites.polito.it/?p=experimental_facilities)
- Partner di una rete di 60+ laboratori in EU (www.**kmm-vin**.info)
- Partner di una rete di laboratori/competenze POLITO sulla giunzione, insieme a DIMEAS e DIGEP: modelling, design, testing di **giunzioni**.





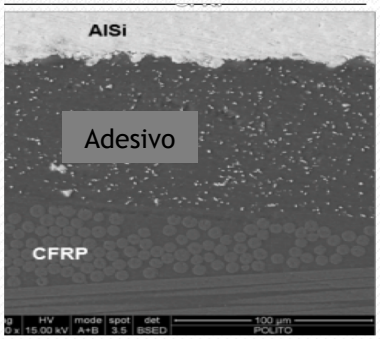
Competenze gruppo di ricerca

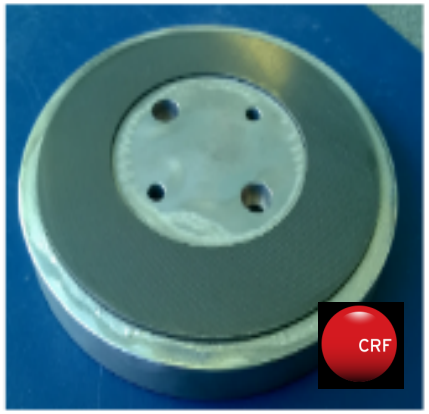
- Design di strutture giuntate/ scelta dei materiali
- Test meccanici su strutture giuntate, adesive e leghe brasanti
- Preparazione e caratterizzazione di giunzioni di materiali per alleggerimento strutture:
  - FRP a metalli
  - Materiali dissimili
  - Materiali sotto forma di schiume, strutture sandwich, honeycomb: ceramici, vetrosi, metallici, polimerici e ibridi
- Sensori in fibra embedded in FRP o giunzioni
- Rivestimenti via sputtering



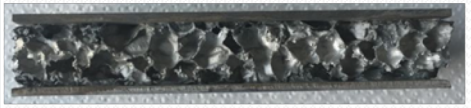
Tecnologie di giunzione alternative alle saldature per materiali dissimili

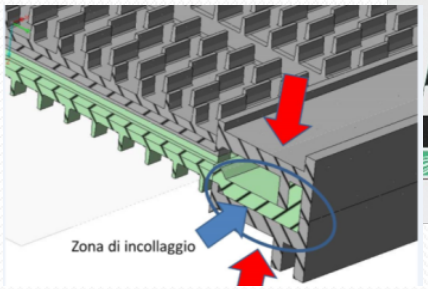
- *Esame delle esigenze di progetto con il committente*
- Proposta soluzioni e scelta opzioni piu' promettenti con il committente
- *Attivita' sperimentale su scala di laboratorio*
- Il committente sceglie quale/i delle soluzioni portare avanti
- *Eventuale supporto per il trasferimento tecnologico e upscaling presso il committente*





Esempi di giunzioni realizzate nell'ambito di progetti





Adhesive/brazing joints for heat exchangers, foam/honeycomb composites, light-weight brakes, cooperation with **DIMEAS-POLITO (Prof. Belingardi) and CRF (Ing. F. Gili)**

Let's keep in touch !

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