

Fondazione Democenter

Additive manufacturing di componenti metallici

MECSPE 2016

Workshop «*Additive Manufacturing per la produzione di
componenti metallici: potenzialità e criticità*»

17 marzo 2016

Fondazione Democenter

Ricerca e innovazione industriale

Trasferimento tecnologico

Formazione tecnica

Creazione di impresa

Tecnopolo Modena - TPM Mirandola - Knowbel Spilamberto

ESPERIENZE FONDAZIONE DEMOCENTER

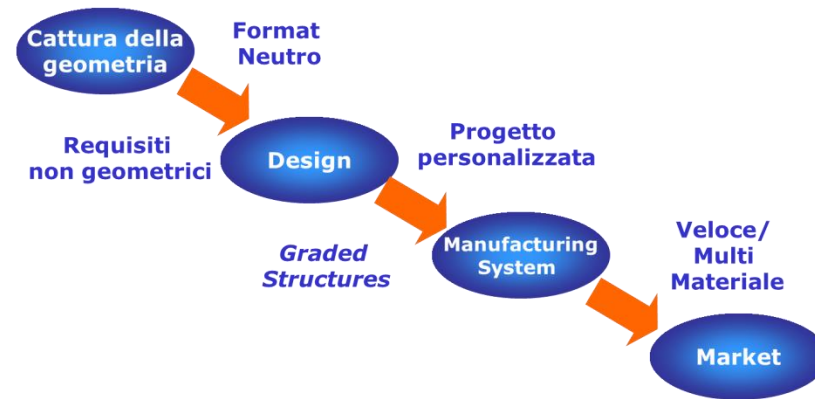
- Pionieri nell'AM negli anni '90 a Modena
Gestito Laboratorio di Rapid Prototyping e di Tecniche di Compressione del Tempo che offriva servizi di progettazione e di prototipazione; il laboratorio disponeva di sistemi di acquisizione tridimensionale e di macchine per la produzione rapida di prototipi e di stampi (LOM, LS metallo, LS sabbia fonderia)
- Dal 2009 consulenza appoggiandosi a rete industriale ormai consolidata e a competenze di Università di Modena e Reggio Emilia
- Supporto alle imprese per lo sviluppo di progetti di innovazione nell'AM



Progetto collaborativo, VI PQ.

Obiettivo: Realizzare prodotti personalizzati sulle richieste e le caratteristiche geometriche del consumatore.

Il processo Custom-Fit



Motorbike seats



Helmets



Knee implants



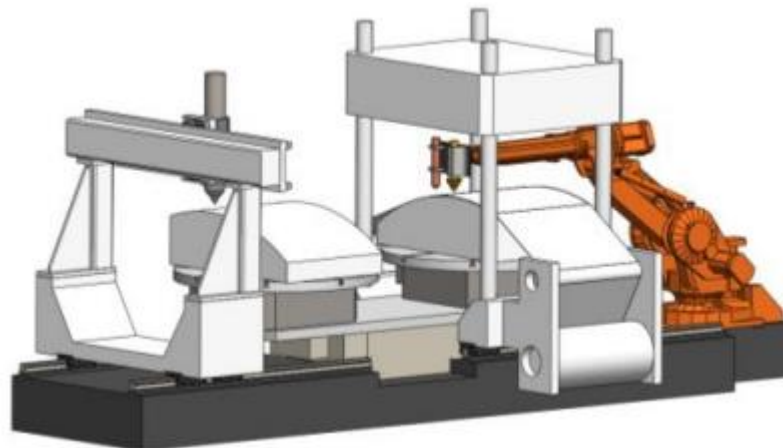
Mandibular implant

Democenter: Coordinatore dei case study: sella, casco, impianto del ginocchio e della mandibola

HYCO^o

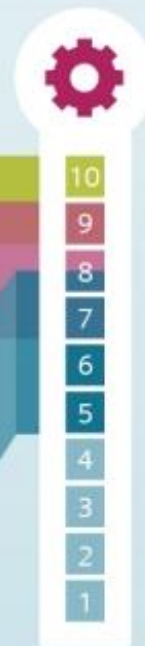
FoF 1-2016, H2020 – RIA (jan 2016)
A New Machine for Hybrid Composites
Manufacturing

.. based on the manufacturing of continuous fibre composite and plastic components combining AM of plastics and composites, milling technology and laser technology.



Sviluppo tecnologico

Sector Overview: Ready for Additive Manufacturing?



Production readiness level ²⁾

Capable of full-scale production

Initial systems already manufactured

Concept phase and lab tests

AM: a cosa serve

Typical applications per industry segment

CONSUMER PROD./ELECTRONICS



- > Production of tools and manufacturing equipment such as grippers
- > Production of embedded electronics, e.g. RFID devices

AUTOMOTIVE



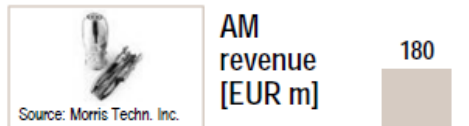
- > Primarily used for rapid prototyping esp. for visual aids and presentation models
- > Production of special components for motorsports sector, e.g. cooling ducts

MEDICAL/DENTAL



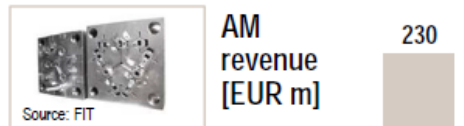
- > Production of dental bridges, copings, crowns, caps and invisible braces
- > Customized prosthetics such as head implants

AEROSPACE



- > Production of lightweight parts with complex geometry, e.g. fuel nozzles
- > Stationary turbine components
- > Reworking of burners (stat. turbine)

TOOLS/MOLDS



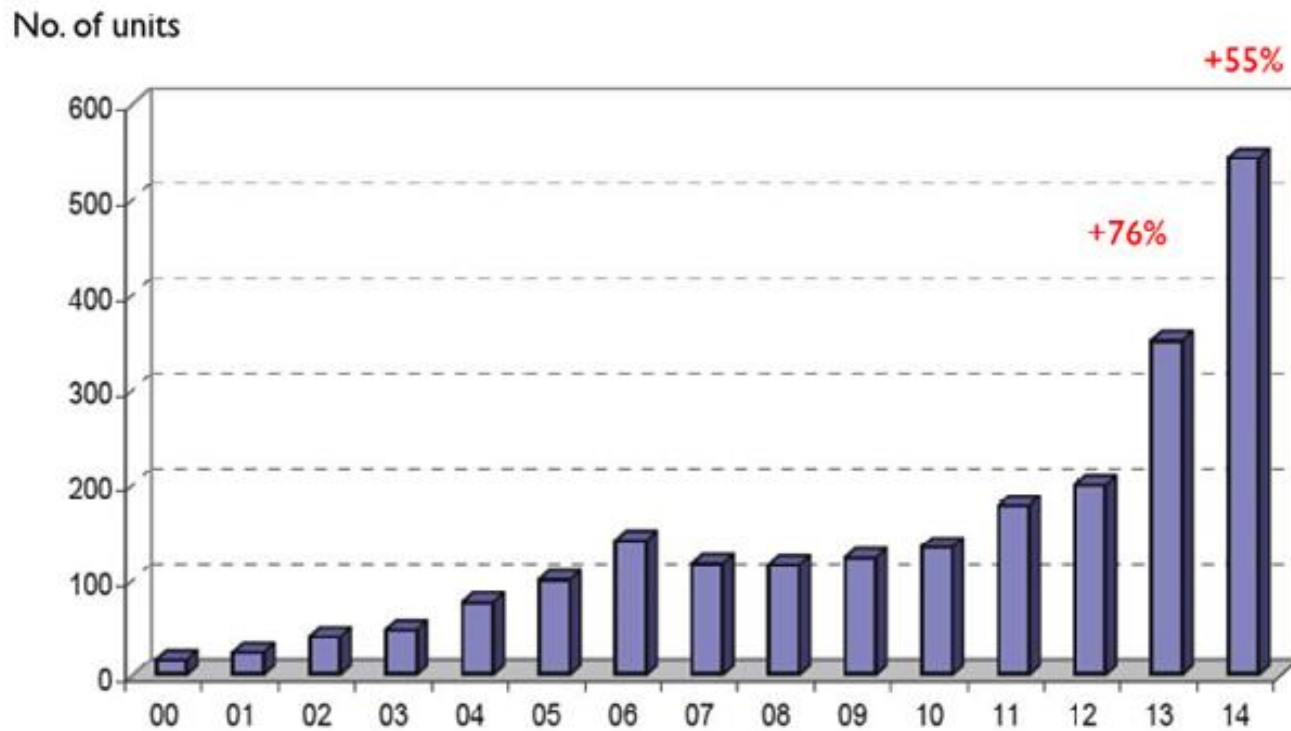
- > High usage for manufacturing inserts and tools/molds with cooling channels
- > Direct tooling (tools made via AM) and indirect tooling (patterns made via AM)

OTHER



- > Several other industrial areas such as military, architectural, oil & gas, space
- > Consumer markets, e.g. customized design objects, collectibles, jewelry

Sistemi AM per componenti metalliche



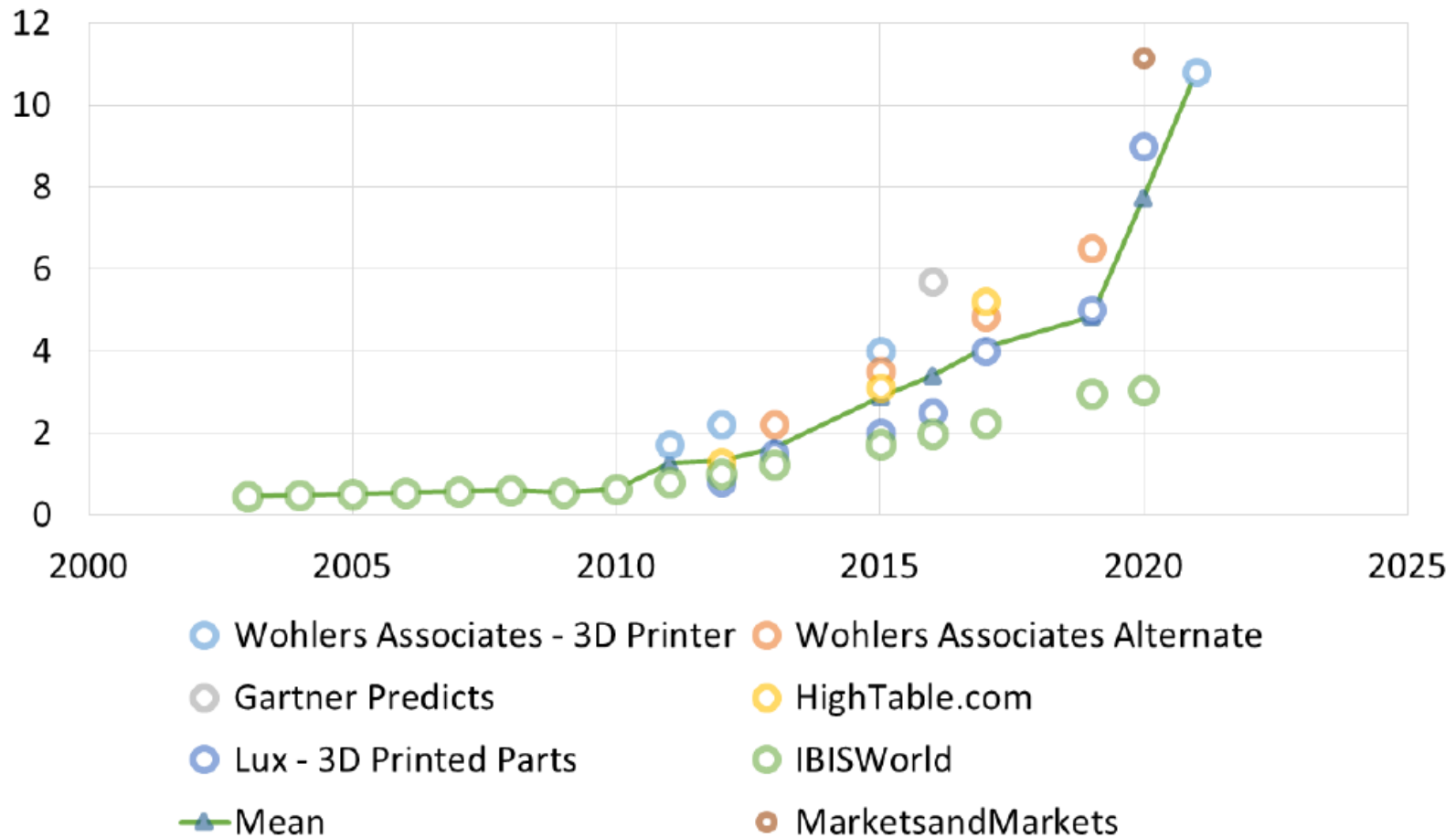
Sales of AM systems for metal parts

Source: Wohlers Report 2015

Mercato



Additive Manufacturing Market Estimates by Analyst



3D Systems, 2015

Costo

Declining costs



Forecast:
Production costs for AM with metal (€/cm³)

50% cheaper | **400% faster**

In the next five years*



Forecast:
Production speed (cm³/h)

AM nell'automotive



CURRENT

Fluid handling

Applications: Pumps, valves
AM technology: Selective laser melting, electron beam melting
Materials: Aluminum alloys

Exterior/exterior trim

Applications: Bumpers, wind breakers
AM technology: Selective laser sintering
Materials: Polymers

Powertrain, drivetrain

Applications: Engine components
AM technology: Selective laser melting, electron beam melting
Materials: Aluminum, titanium alloys

Frame, body, doors

Applications: Body panels
AM technology: Selective laser melting
Materials: Aluminum alloys

OEM components

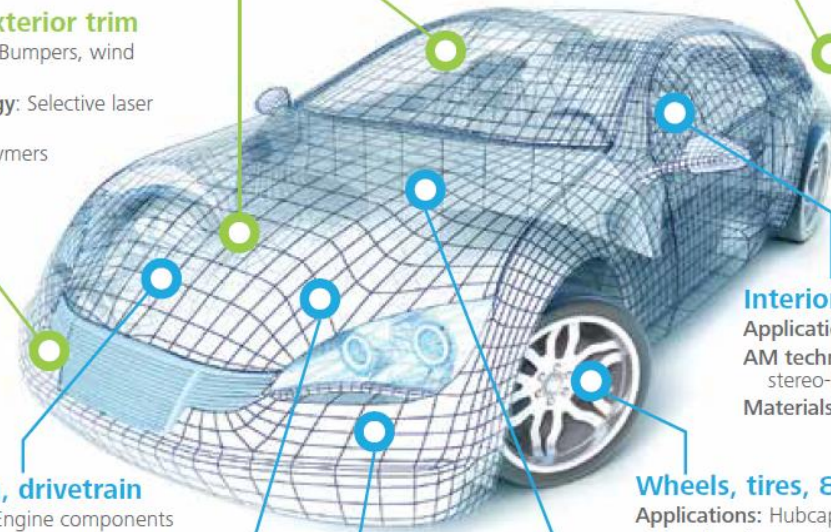
Applications: Body-in-white
AM technology: Selective laser melting, electron beam melting
Materials: Aluminum, steel alloys

Manufacturing process

Applications: Prototyping, customized tooling, investment casting
AM technology: Fused deposition modeling, inkjet, selective laser sintering, selective laser melting
Materials: Polymers, wax, hot work steels

Exhaust/emissions

Applications: Cooling vents
AM technology: Selective laser melting
Materials: Aluminum alloys



FUTURE

Interior & seating

Applications: Dashboards, seat frames
AM technology: Selective laser sintering, stereo-lithography
Materials: Polymers

Wheels, tires, & suspension

Applications: Hubcaps, tires, suspension springs
AM technology: Selective laser sintering, inkjet, selective laser melting
Materials: Polymers, aluminum alloys

Electronics

Applications: Embedded components such as sensors, single-part control panels
AM technology: Selective laser sintering
Materials: Polymers

*Grazie per
l'attenzione!*



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