
SAFRAN
2º SEMINÁRIO PARAPÚBLICO DE
GESTÃO DE FROTA E SEGURANÇA
PR-PMR
POLICIA MILITAR

SAFRAN


SAFRAN
1938
2018
80 ans
YEARS
CÉLÉBRONS ENSEMBLE NOTRE HISTOIRE SUR :
CELEBRATE OUR STORY TOGETHER ON:
80YEARS.SAFRAN-HELICOPTER-ENGINES.COM

SAFRAN

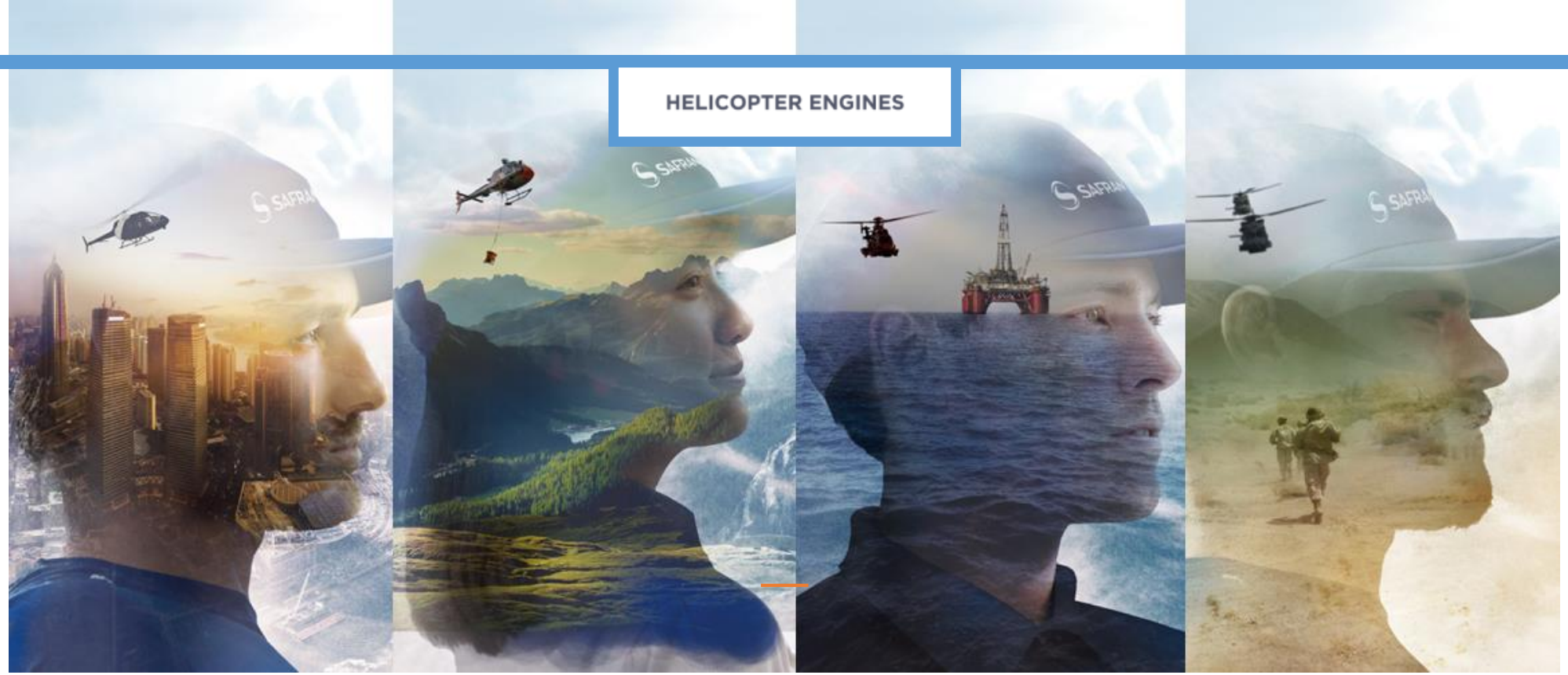
APRESENTAÇÃO:

INOVAÇÕES SAFRAN

JONATAN MELLO (SAFRAN HE)

FRANCISCO TRILLO (SAFRAN HE)

SAFRAN



SAFRAN HELICOPTER ENGINES
MRO 4.0 – WAY TO EXCELENCE

March 2018

SAFRAN

Current Initiatives

AUGMENTED REALITY

FLOW SIMULATION

COBOTIC

ADDITIVE MANUFACTURING

NDT

TEST

INSTRUCTION OF THE FUTUR

VIRTUAL REALITY

LOGISITIC

Factory 3D Modeling

Industrial Organization

Create **immersive space** before real construction

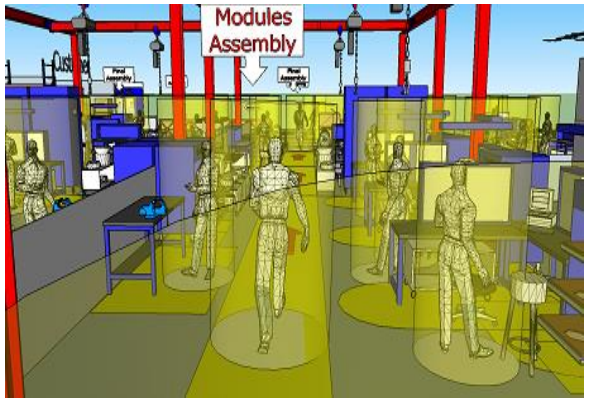
Recreate current space to **try new organization** or to add new technologies

Anticipate new machines or new tools entry in service

Place future **user in the virtual environment** and analyze their reactions

Use the virtual environment **for training**

- **Our targets aimed with factory 3D Modeling :**
  - **Quicker definition of industrial industrialization**
  - **Right at the first time : constraints anticipation**
  - **Full immersion ➔ pro active industrial solutions**
  - **Space and flow optimized**



Predictive Flow Simulation

La plateforme de simulation prédictive pour les professionnels de la modélisation

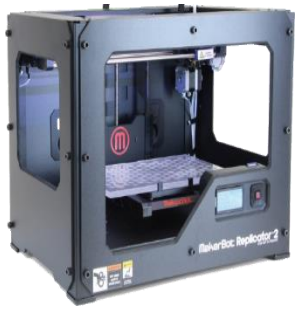
Predictive flow Simulation :
Development/programming of **dynamic and statistically relevant** models to represent the behavior of **complex systems**.

- **Our targets:**
  - **Contribute to the reduction of the TAT and to the improvement of the efficiency**
  - **Test industrial scenarios (ramp-up / down, impacts mix, organization)**
  - **Participate in the validation of big investments**
  - **Collaborate in the development of this technology in SAFRAN (Landing Systems, Aircraft Engine)**

Dynamic MRO Model

ADDITIVE MANUFACTURING

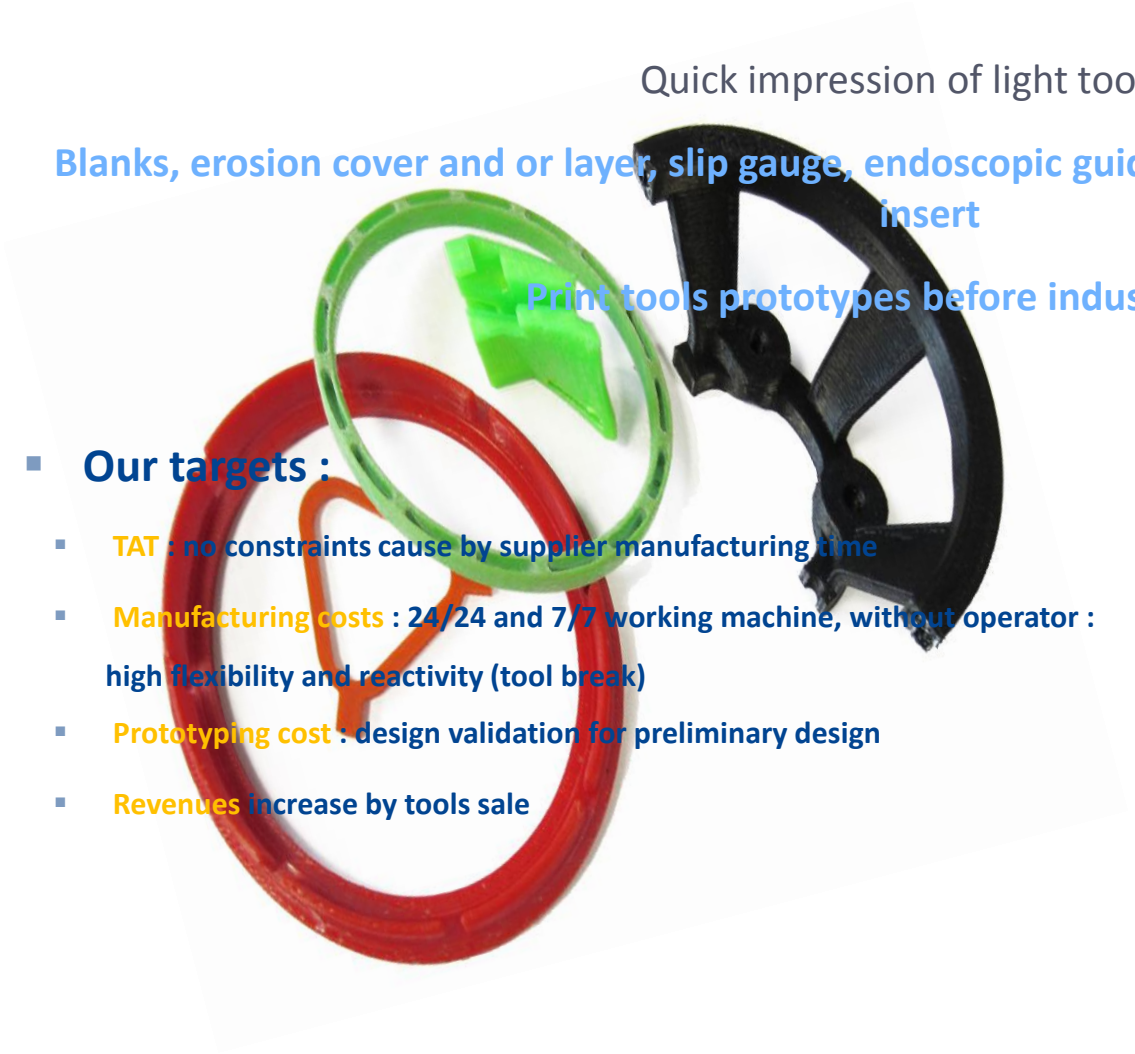
LIGHT TOOLING PRINTING



Quick impression of light tooling :

Blanks, erosion cover and or layer, slip gauge, endoscopic guide, immobilizer with dent, caoutchouc insert

Print tools prototypes before industrialization



- **Our targets :**
  - **TAT : no constraints cause by supplier manufacturing time**
  - **Manufacturing costs : 24/24 and 7/7 working machine, without operator : high flexibility and reactivity (tool break)**
  - **Prototyping cost : design validation for preliminary design**
  - **Revenues increase by tools sale**

Logistic - *Geo Tracking*

Track and monitor all parts, accessories, engines, modules and tools

Store movement data in order to quickly identify anomalies

- **Our targets:**
  - **Reduction of seeking time**
  - **Reduction of control**
  - **Optimization of tool storage**
  - **Big data : flow analysis and improvement actions**

Connected Worker - *Voice Recognition*

Allow worker to manage service order and job reporting using voice recognition

without manual action on computer

- **Our targets:**
  - **Make the worker more autonomous**
  - **Allow worker to be more focused on added value**
  - **Reduction of Stop and Go between asset and computer**
  - **Reduction of paper management**
  - **Big data: standardization of data recorded**

Cleaning

Before Ice cleaning

Allow to clean asset without disassembly

Ease the dirty review

Flexible tool with less environmental impact

Alternative to sand blasting

Ideal for oil and cokefaction pollution

Can be apply before return to customer

- **Our targets:**
- **Efficiency ➔ operating time reduction**
- **TAT reduction : flexible mean**

- **Qualitative gains:**
- **HSE : green technologies**

- **Reduction of cosmetic claim**

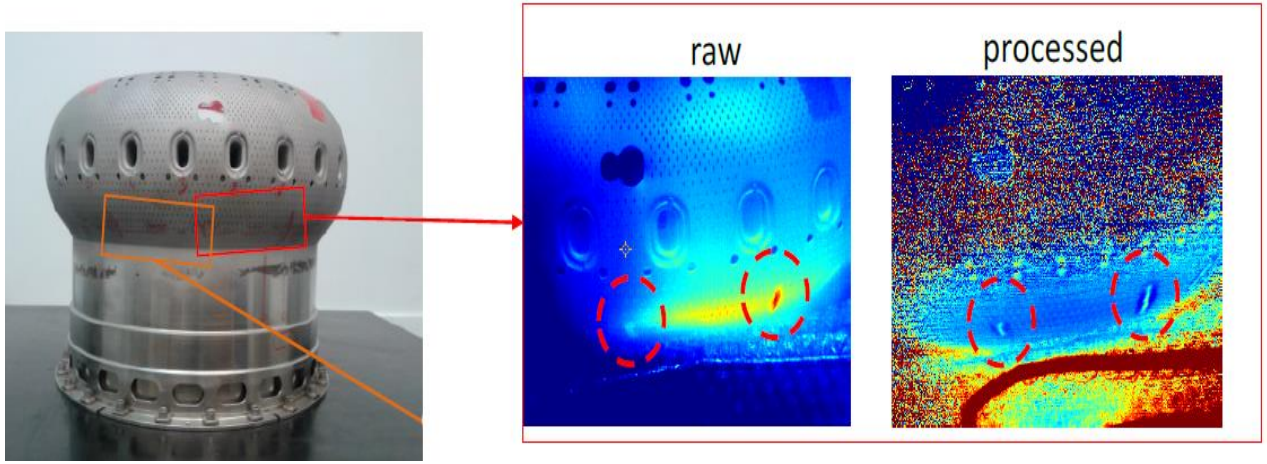
After Ice cleaning

NDT - *Thermography Control*

➔ Detection of cracks by Thermography (NDT alternative)

➢ Objectives :

- Automatisation of the cracks detection with termography and **picture analyse**
- Replace NDT process by **automatic system**
- Generate data OF MRO dammages
- Optimization of information exchanges between SHE (RPC) and SHE sites during inspection of parts



R&D test on Makila part / 2017

NDT - *GELSIGHT*

Directly assessment information on a parts surface

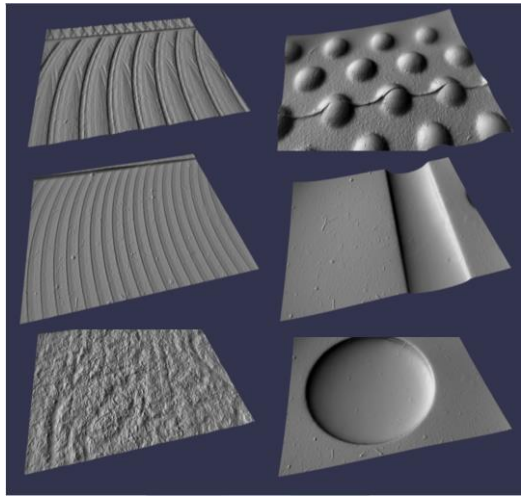
(roughness, depth of cracks, width of cracks, etc.)

Remove all doubt and save parts from scrapping, save time on deeper analysis

Alternative to other metrology tool

Uses to remove doubt on quarantine parts and save more parts

- **Our targets:**
  - **Efficiency : operating time reduction**
  - **Part saving : direct from evaluation, and quarantine**
  - **Data storage and analysis : criteria improvement**



Augmented Reality - *Evaluation Enhancement*

Bring instantaneous enhanced criteria decision to the evaluation specialist

Real time information and support – (hotline)

Observe, Execute and record mode

Decision help thanks to enhanced criterias in field view

Direct observation database (evaluation)

Step by step management of tasks

- **Our targets:**

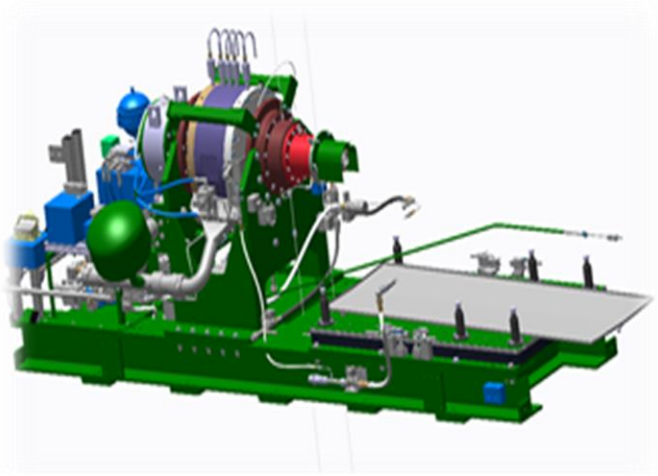
- **Efficiency ➔ operating time reduction**
- **TAT reduction**
- **Reactivity**
- **Training cost (new engine configuration)**
- **Quality ➔ less human factor**
- **Big data**
- **Flexibility**

Test – *Digital Clone*

All bench components are cloned

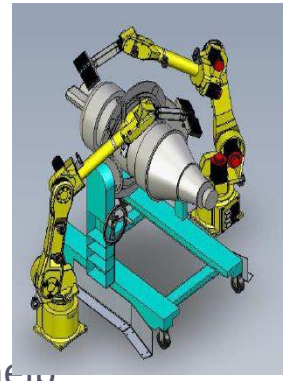
All test material are followed in configuration

The troubleshooting can be done at anytime by distance: no need to be on the spot



- **Our targets:**
  - **Reactivity ➔ troubleshooting from 3 to less than a week**
  - **Human resources ➔ less travel for TAE ➔ - 33%**
  - **Test cell availability ➔ from 83 to 95%**
  - **HSE ➔ troubleshooting by computer rather than on the shop**

COBOTIC - *Final Control by Robot*



Final control conduct by high definition camera

Camera movements control by **two small robot fully autonomous** & decision help

Human control reduce to the only zone inaccessible by the robot

Last task memory

Technology already used and mature on CFM engines

- **Our targets:**
  - **Labor time : on 1h => 10 min left to human control**
  - **TAT reduction : 1 days the first year**
  - **Quality : less human factor and C to A level for Airbus Industries quality-supplier cotation**
  - **HSE : Less human movements around the engine**

SAFRAN HE Brasil – What we want to be in 2020...

1. A company anticipating its customers needs (“Outside in”)
2. The best performer in terms of operational cost, quality and delivery
3. The most efficient and agile organization
4. Recognized as the benchmark in management by processes, automatized and reliable
5. An innovative organization
6. Environmentaly self sustainable (energy & water usage efficiency, recycling, neutral CO2 emission)
7. A strong and unified company culture, aligned with our values.
8. Part of the best companies to work (Top 100 Great Place to Work)
9. Active player in social responsability, interacting with our community and our employees
10. A voice recognized and influential at Corporate level

P2S

Production Support System

POWERED BY TRUST

One Safran

APRESENTAÇÃO:

INOVAÇÕES SAFRAN

SAFRAN HELICOPTER ENGINES
ACADEMY

(Francisco TRILLO)

SAFRAN

Safran Helicopter Engines Academy

TRAINING TERMINAL

EXPERT COURSES • FOR MAXIMUM PROFICIENCY IN SPECI

- On-site scheduled inspections support, 2017
- EECU software downloading
- EDR data reading
- Vibration checks
- Fly your engine too, FOR PILOTS

ADVANCED COURSES • FOR OPTIMUM EFFICIENCY AFTER 1ST LINE MAINTENANCE QUALI

- Engine Power Check, 2017
- Refresher & troubleshooting, 2017
- Borescope inspection best practices per engine
- MAKILA 1A-1A1 ECU maintenance

APPROVED MAINTENANCE COURSES • FOR TYPE RATING QUALIFICATION

- 1st line Maintenance (level O)
- 2nd line Maintenance (level I)

INTRODUCTORY MODULES • FOR GENERAL KNOWLEDGE

- Engine familiarization
- General information on gas turbines
- Maintenance Manager basics, 2017

YOUR FLIGHT PLAN

CHOOSE YOUR PASS

YOUR TRAINING PASS	EXPERT
Advanced Pass included Scheduled insp. support 2 other expert courses	DISCOUNT*
	36 MONTHS

YOUR TRAINING PASS	ADVANCED
Approved Pass included Borescope best practices Refresh & Troubleshooting	DISCOUNT*
	18 MONTHS

YOUR TRAINING PASS	APPROVED
Level 1 & 2 courses	DISCOUNT*
	6 MONTHS

* Valid in 2017. Please contact your Customer Service Manager or Training representative for terms and conditions.

EASA · Australian Government Civil Aviation Safety Authority · Transport Canada · CAAC

Safran Helicopter Engines Academy

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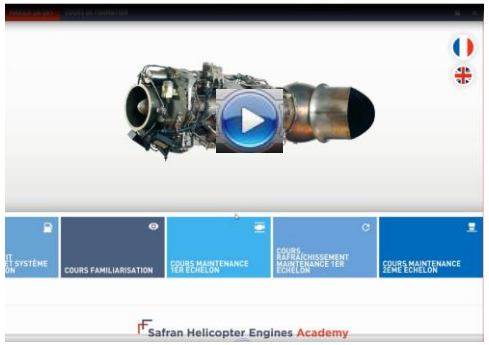
1 - Approved courses with current 2D technology :

example of the MAKILA-2_PlayerStd2D



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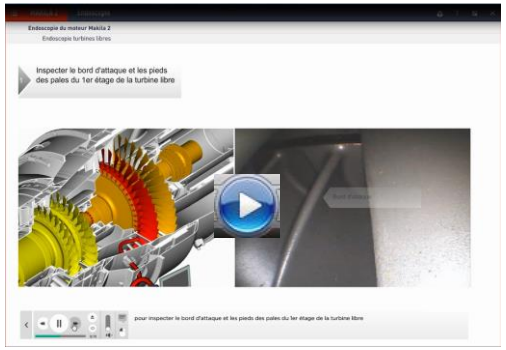

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❑ II - TRAINING CATALOG COURSES AS OF 2018 NEW ENGINES

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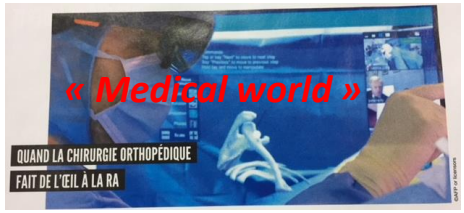
- **II - TRAINING TEACHING AS OF TOMORROW….?**

5 - RA (Augmented Reality) Diota Player

Many Applications…..



« Iphone application »

« Hololens from Microsoft »

« Glasses/Tablet application »

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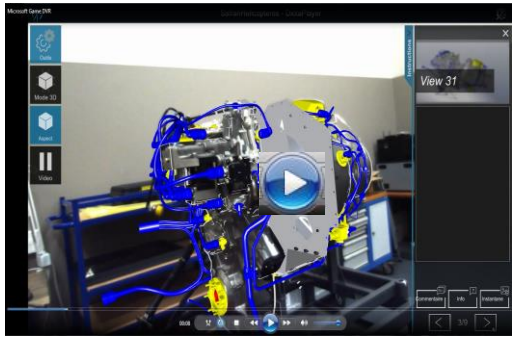

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6 - RVI (Immersive Virtual Reality from CapGemini) SafranHE Prototypes for Management & Commercial personnel