

ADVANCED MATERIALS CLUSTER

Co-ordinator

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Advanced Materials Cluster - Composition

COMPRESSOR - EXHAUST	COMBUSTOR	TURBINE
OPSURCON* MANHIRP	CPLIFE	ABRATIP* ADSEALS
RAMGT		ORDICO OPTISPRAY
EPROTAC DOLSIG DuTiFrisk		ATFP* VERDICT
		CMC Lifing CMC Design* - UHTHE/EFCC/B4* TBCPLUS - HITS

 18 projects. (*=Finished).



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Advanced Materials Cluster - Milestones

EIMG focal points meeting	4 th Feb. 1999, Brussels	Identify research gaps
Cluster mini workshop	1 st Oct. 1999, Hatton Cross	Present Austrian Aeronautics Industry
EIMG focal point meeting	1 st Oct. 1999, Hatton Cross	Define/prioritise work programme
Kick off workshop	18 th May 2000, Cologne	Review projects progress



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Advanced Materials Cluster - Milestones

2 nd Workshop	27 th July 2000, Petten	Identify research gaps. Input to SWOT+TP
Aerodays Sessions and Stand	29-31 st Jan.2001	Cluster & Projects presentations. 2 papers published
3 rd Workshop	29 th March 2001, Turin	Tech. Gap Analysis + State of the Art Update. M&O co-ordinator present.
4 th Workshop	26-27 th September 2001, Liege Postponed	In parallel with Manufacturing workshop with joined session.
CAME GT Workshop	1 st October, Brussels	Presentation of the AMC



Advanced Materials Cluster - Deliverables

Nature	Date issued to EC
6 months report	09.12.99 (via TRA manager)
12 months report	31.05.00
18 months report	11.09.00
TRA-EEFA 5 year technology plan, 18 month basis	25.08.00
24 Month Report	27.08.2001



CALL 3 RESULTS

Acronym	Title	Co-Ordinator	Call 3 results
VERDICT	Virtual Evaluation and Robust Detection for engine Component non destructive Testing	SNECMA Richard Coulette	EU Accepted
ACCTIFF	Advanced Coating Combinations on TI alloys Facing Fretting and wear	SNECMA Per Bengtsson	EU Rejected
Q-Life	Quality assessment of assumptions in the life prediction of aero engine components	VOLVO Niklas Jarstrat	EU Rejected
DuTiFRISK	Dual Material Titanium Alloy Friction Welded BLISK	MTU Olaf Roder	Accepted
OPTISPRAY	Optimisation of spray Forming of Advanced High Quality Components of Superalloys for Aeronautic Applications.	ITP Iñaki Madariaga	Accepted



Advanced Materials Cluster- Future research

COMPRESSOR

- optimised containment materials
- weldable materials for structural components
- optimise castability and weldability of existing alloys for higher temperatures applications (+100°C)
- Flame resistant Ti-alloy for compressor blades or casings
- P M Cs/ M M Cs for Blings (mostly military)
- Cheaper, thinner SiC fibres for cost effective and reliable MMC's
- Aluminium matrix composites for compressor blades and all low temperature structures.
- Strong light-weight alloy for compressor discs (up to 600°C)



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Advanced Materials Cluster- Future research

COMBUSTOR

- Materials with increased temperature capability for combustor parts
- Advanced Coatings / Thermal Barrier Coatings (TBC)
- Bond coats for high oxidation corrosion / temperature resistance
- Low cost Ceramic Matrix Composite (A720)



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Advanced Materials Cluster- Future research

TURBINE

- Improve sealing materials and technology
- Low cost materials with a high temperature capability (Fe-Based superalloys)
- High temperature alloys for discs applications above 700°C (U720 successor)
- Turbine shafts with high stiffness and high resistance
- TBC for rotating parts (Fe-Al, MMCs, Maraging steels...)



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Advanced Materials Cluster- Future research

BEARING

Low cost part, with increased wear and corrosion resistance

Ceramics, Coatings on races, Plastic cages

EXHAUST CONE

- Reduced weight and increased temperature capability
- CMC (Black Glass), Ti-Al



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Advanced Materials Cluster- Future research

Lifing/Manufacturing/Process Modelling

- Define tests to get representative engine data.
- Optimise analysis of standard test data prior to model input.
- Understand effect of variation in manufacturing route on Materials integrity
- Develop low cost local heat-treatment methods.
- Develop an optimised process chain from condition of supply to finished part (MMSFC)



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Advanced Materials Cluster- Future research

Lifing/Manufacturing/Process Modelling

- Predict with accuracy the final microstructure and mechanical properties in component form.
- (First : Develop modelling for a single manufacturing step, ie casting, cutting...)
- Repair and salvage of single crystal components with defects
- Design components with increased resistance to F.O.D. (RAMGT needs to be extended to turbine blades.)



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Advanced Materials Cluster - Conclusions

Facilitate information transfer

- Research duplication avoided; Facilitate Call preparation
- Increase success chances at EC selection if proposal attached to a well defined cluster strategy

overall success rate: 73%

(8 accepted out of 11 projects proposed at call 1,2 and 3.)

Build relationships

- Answers P Busquin's vision of ERA (network)
- Potential for building good relationships with the EC
- Route towards influencing future FP Programme



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Questions?



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