rota2030

FUNDEP

UNIVERSIDADE FEDERAL DE SANTA CATARINA

Fraunhofer IPK

INSTITUTO SENAI DE INOVAÇÃO LASER

ipt INSTITUTO DE PESQUISAS TECNOLÓGICAS

ITA

ROTA 2030

FeB+C Ferramentarias Brasileiras Mais Competitivas

FERA II

FERRAMENTAS MANUFATURADAS ADITIVAMENTE

CONSORTIAL PROJECT

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Prof. Dr. h. c. Dr.-Ing., Eckart Uhlman
Prof. Dr. Aloísio Nelmo Klein
Me. Moysés Leite de Lima

April 30th, 2024

FERA II - Ferramentas Manufaturadas Aditivamente: *Partners Network*

2023

30 2020

Automakers + Tiers 1, 2, 3 + Toolmakers +

Machine + Software + Material + IST's

\+

2027

2024

= mover

FeB+C

FERA II
FERRAMENTAS
MANUFATURADAS
ADITIVAMENTE

IST's	Automakers	Tiers 1, 2, 3	Toolmakers	Material	Machine	Software
ITA	GM	BOSCH	emicol	Höganäs	ROMI	VirtualCAE
INSTITUTO SENAI DE INOVAÇÃO LASER	FCA FIAT CHRYSLER AUTOMOBILES	IOCHPE-MAXION	Isenf (Member IMC Group)		RÖSLER, OTEC	HEXAGON
ipt	Mercedes-Benz	SABÓ	StarSU		VAS	LEAN 4.0
Fraunhofer IPK	CATERPILLAR	CIP-COMPANHIA INDUSTRIAL DE PEÇAS	STIHL		Alkimat	
UFSC		INDABI			Casafer	
		WEG, CESTARI			FARCCO TECNOLOGIA	
		ZEN			Wietech	
		FRASLE				
		TRANSMISERVICE				

ITA · ipt INSTITUTO DE PESQUISAS TECNOLÓGICAS · INSTITUTO SENAI DE INOVAÇÃO LASER · Fraunhofer IPK INSTITUTE PRODUCTION SYSTEMS AND DESIGN TECHNOLOGY · UFSC · FUNDEP

FERA II: *Project Background*

Program FEB+C

ROTA 2030 FeB+C

FERRAMENTARIAS BRASILEIRAS MAIS COMPETITIVAS is a ROTA 2030 Program for the development of the Tooling Sector

FUNDEP 03/2020 call for projects launched in April 2020:
Disruptive Research and Development (TRL 2-4)

ADDITIVE MANUFACTURING (AM) WAS A MAIN PROJECT THEME

Background

ITA · Fraunhofer IPK · ipt Instituto de Pesquisas Tecnológicas · Centro de Competência em Manufatura · Instituto SENAI de Inovação Laser · HUB Brasil Manufatura Aditiva · Engrena ITA

Several Joint Additive Manufacturing initiatives background between STI's

Project proposal

FERA

FERRAMENTAS MANUFATURADAS ADITIVAMENTE

To integrate STI's and companies to place the national AM for Tooling in the same competitiveness level of leading countries

> 100 meetings with partners for the Project's elaboration from industrial demands

- **Aug/2020:** FERA Project Submission
- **Oct/2020:** Project Approval
- **Mar/2021:** Project Kick-Off
- **2021 – 2023:** FERA Project Execution
- **Out/2023:** FERA II Project Submisson
- **April/2024:** FERA II Approval

⋮

FERA II: *Project charter*

Additive Manufacturing is a technology with disruptive potential to increase the competitiveness of the Tooling Chain. However, application is not mature.

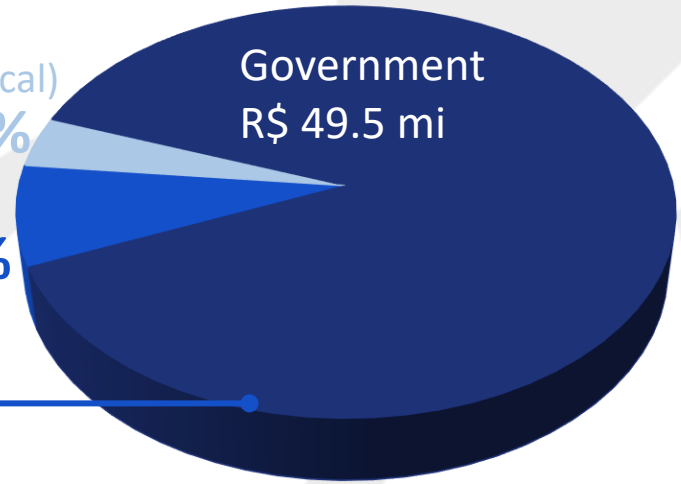
Increase the spread of additive manufacturing in the Brazilian industrial sector and develop domestic raw materials to supply the production chain with larger volumes of production

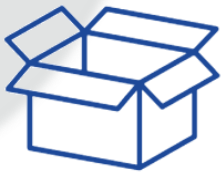
3 years

FERA II

FERRAMENTAS MANUFATURADAS ADITIVAMENTE

R$56.2 million





Semi-automated repair, Manufacture of complex geometries, Industry training, Scientific disclosure, Internationa Benchmark, technical-economic feasibility panorama

FERA II: *Specific objectives of competitiveness*

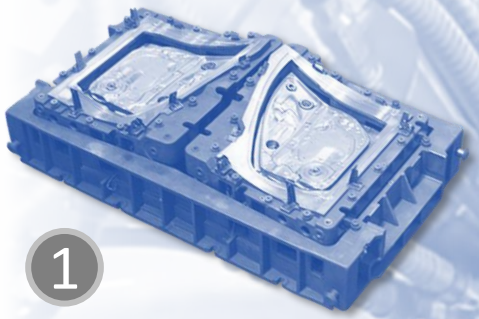
... with the specific objectives of:

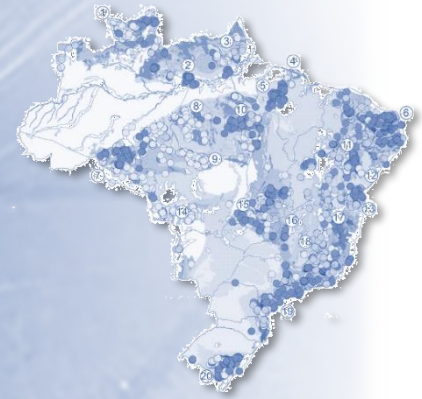
To develop and validate...	Performance	Productivity	Costs
Know-how in alloy engineering for additive manufacturing based on national minerals	✓		
Development of atomization processes nationwide	✓	✓	✓
Optimization of methods for semi-automated inspection and repair by additive manufacturing	✓	✓	✓
Functional verification based on bench tests for components manufactured in MA	✓	✓	
Development of component qualification methods	✓	✓	
Development of an implementation guide for an additive manufacturing cell	✓	✓	✓
Nationalization of metal powder atomization equipment technologies		✓	✓
Decision guide for metal additive manufacturing	✓	✓	✓

FERA: *Scope*

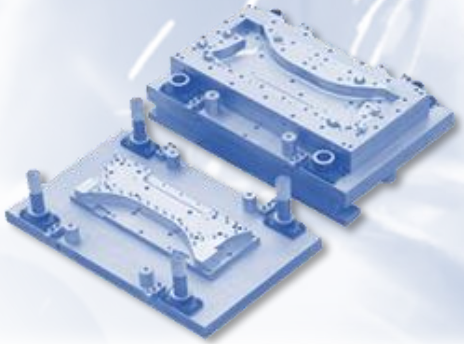
FERA II

FERRAMENTAS
MANUFATURADAS
ADITIVAMENTE

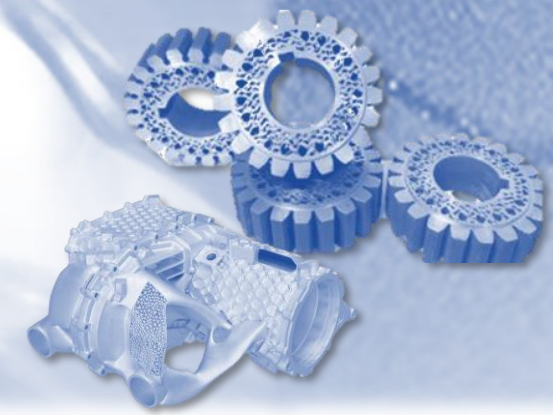




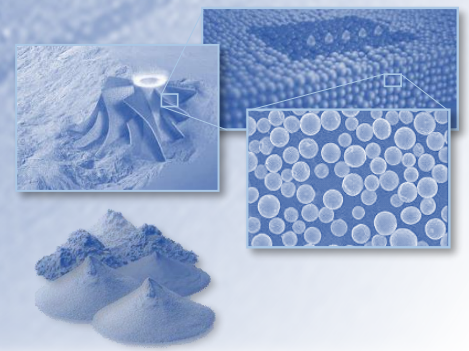
1 **Industrial Application**



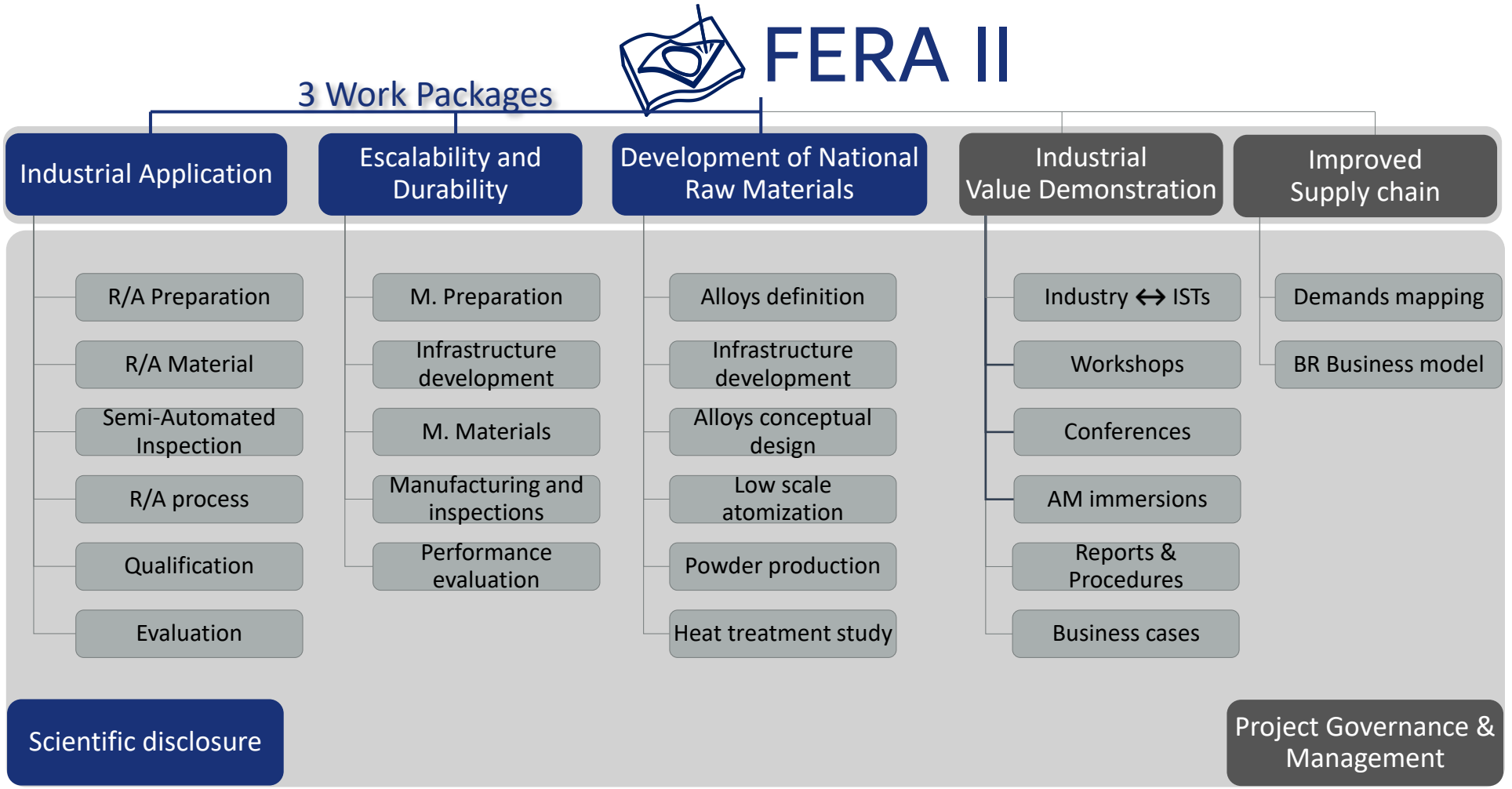
2 **Escalability and Durability**



3 **Development of National Raw Materials**



FERA II: *Scope – Simplified Work Breakdown Structure*



Project continuation for **Entrepreneurship & Industrial Application: NEXT MOVER CYCLES (with > TRLs)**

FERA II: *Project Governance*

FERA II

GOVERNANCE

Coordination Level

Ministry of Economy

Rota 2030 L(IV) - Program Commitee
IPT, FUNDEP, Technical Counsel

R$ - Resource transfer

Project Steering Commite
- STI's Coordinators
- Company representatives

Technical Level

Technical Team
- Project Manager
- STI's Team Leaders
- Company Teams

Steering Commitee Meetings (Symposia)

1st year	2nd year	3rd year
Q4/2024	Q2/2026	Q2/2027
Q4/2025	Q4/2026	Q4/2027

Steering Commitee Meeting Participants

Coordination Level
Representative from Fundep
Representative from IPT
Representative from the Tech. Counsel
STI's Coordinators
Representatives from the Companies

Technical Level
- Project Manager and STI's Team Leaders

Follow-up meetings
Regurlaly scheduled

Project Knowledge and Communication Management

Meetings plan

Meeting minutes will be stored in the Teams directory

MIRO platform will be used to share ad follow the developments

Meeting	Format	Frequency	Attendees
Symposia	In-person	Biannual	Steering Comitee
Follow-up WP1	Virtual	Monthly	STIs and Companies
Follow-up WP2	Virtual	Monthly	STIs and Companies
Follow-up WP3	Virtual	Monthly	STIs and Companies
STI's follow-up	Virtual	Bi-Weekly	STIs
Immersions	In-person	Scheduled	STIs and Companies

Follow-ups with companies will happen once a month

FERA II: *Expected results*

- Semi automated repair methods for tools repair
- AM tools manufacturing chains
- State-of-the-art of AM materials for tooling
- AM deposition in cast iron development
- Surface integrity assessments
- AM tools validation
- AM Decision support guide
- High volume AM manufacturing development
- Technical-economic feasibility analysis for Brazil
- Scientific research publications
- Industrial training
- Projects for next MOVER calls

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