



## ADDITIVE MANUFACTURING VILLAGE WS 2023

- MILITARY USE CASE EXPLORATIONS  
FOR AM TECHNOLOGIES

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MLCC DEPUTY DIRECTOR



# Multinational Logistics Coordination Centre (MLCC)

Additive Manufacturing Village 2023

## Agenda



*Feedback from AM Village – Interoperability:  
Armed Forces, Industry, Academia*

*BDR – potential 3D printing use*

*Future Cooperation Activities*





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Additive Manufacturing Village 2023

## Aim of AM Village 2023

- 1) Defining AM military use cases – focusing on deployed military missions.
- 2) Identify appropriate AM technologies which can potentially provide logistic advantages to deployed armed forces.
- 3) WS – to constitute the opportunities and benefits of establishing, organizing, and operating jointly funded logistics operations and maintenance capabilities based on multinational cooperation.





# Multinational Logistics Coordination Centre (MLCC)

Additive Manufacturing Village 2023

## Additive Manufacturing (AM) Village 2023 Workshop

### What

- 5-day workshop combining live AM demonstrations and conceptual workshops bringing together Military, Industrial and Academic AM Capabilities and experts

### Who

- Led by: MLCC, European Defence Agency (EDA), The Royal Netherlands Army  
~ 230 participants / 21 Countries (~120 Military, ~70 AM Industry, ~40 Academia)

### Why

- Review and update AM capabilities by testing and demonstrating deployable AM solutions for different military use cases, gathering the Additive Manufacturing community in a live testing environment (substitution for postponed CL23)

### When

- 12 – 16 June 2023 (+ 5 preparation meetings)

### Where

- Royal Dutch Army's Field Lab Smartbase, Ede, NLD



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## AM Village 2023 - Scope

- Addressed to military AM experts, military staff dealing with regular maintenance and repair, and expedient maintenance in all services of Armed Forces
- Improving cooperation with industry IOT identify “tailored to the mission” solutions
- Enforcement of cooperation amongst various stakeholders aiming for interoperability regarding AM applications for military purpose
- The objectives of MLCC SD 2.1084 & EDA CAT B Project AM for Logistic Support served as a guideline for the workshop
- The workshop provided findings for the application of AM solutions (e.g., for BDR)





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Additive Manufacturing Village 2023

## Timeline

Times	Mo, 12.06.	Tu, 13.06.	We, 14.06.	Th, 15.06.	Fr, 16.06.																														
0800-0830	Arrival & Setup	Morning Brief		Morning Brief																															
0830-0900		<b>SEMINAR 2:</b> AM Applications in the Land Domain (FULL DAY, ROLLING TIMELINE)  a. National Military Requirements	TBD	TBD	Fraunhofer IAPT	Brief: IF CEED	XERION	cMS & Industry WS	Dedicated BDR Seminar	Survey																									
0900-0930			Titomic								cMS & Industry WS	BDR Workshops	cMS & Industry WS	BDR Workshops																					
0930-1000															Fieldmade	AM products within the logistic processes	Distinguished Visitor's & Media Day	EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops														
1000-1030																						Welcome, Introduction, Housekeeping, Location Tour	National Military Requirements	AM products within the logistic processes	Distinguished Visitor's & Media Day	EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops						
1030-1100	EDA-MLCC EoL																													DMFG / Grab	cMS & Industry WS	BDR Workshops			
1100-1130		EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops																														
1130-1200	EDA-MLCC EoL					DMFG / Grab	cMS & Industry WS	BDR Workshops																											
1200-1230		EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops																														
1230-1330	Lunch																																		
1330-1400	<b>SEMINAR 1:</b> AM files and its handling amongst users including Cyber Security aspects	<b>SEMINAR 2 (Cont.):</b> b. Suitable AM technologies for military use cases and its specifications in the land domain	Lynxter	cMS & Industry WS	BDR Workshops	Distinguished Visitor's & Media Day	cMS & Industry WS	BDR Workshops	<b>SEMINAR 5:</b> AM applications in the Maritime Domain	Rheinmetall	cMS & Industry WS	BDR Workshops	Departure																						
1400-1430														CZ Demonstration	AM products within the logistic processes	Distinguished Visitor's & Media Day	EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops															
1430-1500																					National Military Requirements	AM products within the logistic processes	Distinguished Visitor's & Media Day	EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops								
1500-1530																												Welcome, Introduction, Housekeeping, Location Tour	National Military Requirements	AM products within the logistic processes	Distinguished Visitor's & Media Day	EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops
1530-1600																																			
1600-1630	EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops																															
1630-1700					EDA-MLCC EoL	DMFG / Grab	cMS & Industry WS	BDR Workshops																											
NB:	Blue: Live	Green: Academic Seminar	Permanent Activities																																



## Live Demonstrations Overview

- Participants (contingents) deployed with capabilities (10x Military & 9x Industry)
- Open to all AM Village 2023 participants & visitors
- Interactions between Industry and Military or Military and Military
- Use cases / samples identified prior and/or during the event
- Survey (Feedback) at the end of interactions
- Findings and conclusions as a basis for further actions (e.g. lessons learned, developing of concepts, inputs to BDR BPC)
- Challenge of the day





## AM Village Academic Seminars Overview

- **Seminar 1 - AM files and its handling amongst users including Cyber Security aspects** (Mon)  
*(Rheinmetall; Fieldmade; VIACCESS ORCA; Senovi)*
- **Seminar 2 - AM Applications in the Land Domain** (Tue)  
*(KIWA N.V.; AWL; WSU; Tectonic; DMFG Solutions; INEGI; Titomic; UNOB; MUT)*
- **Seminar 3 - AM products within the logistic processes** (Wed)  
*(Eindhoven University of Technology; Fieldmade)*
- **Seminar 4 - Education and Training of AM personnel** (Thu)  
*(EWF; AM Platform; Idonial)*
- **Seminar 5 - AM applications in the Maritime Domain** (Thu)  
*(Thyssenkrupp Marine Systems; Naval Command German Navy)*
- **Seminar 6 - BDR Seminar** (MLCC / SD 2.1084 Project oriented) (Thu)  
*(MLCC; S10 Consulting; MCLSB CSS WG; HQ SACT; AUT; BEL; CZE; DEU; FRA; GBR; NLD; NOR; POL; SVK; SWE; USA)*



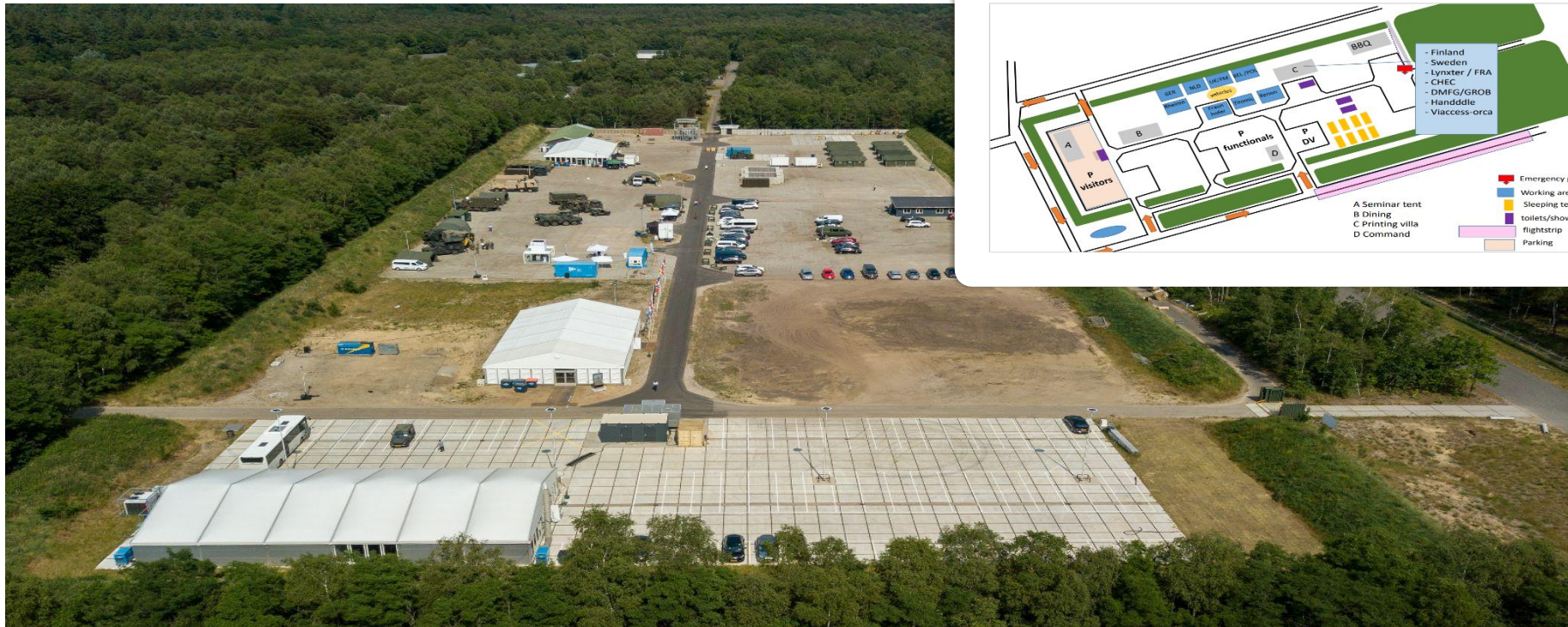




# Multinational Logistics Coordination Centre (MLCC)

Additive Manufacturing Village 2023

## Site Map





## Distinguished Visitors' & Media Day

- **Who:**
  - MLCC Director, EDA Chief Executive, NLD Land Forces  
Commander Distinguished visitors 52 PAX (incl. 14 National  
Reps. / 14 Industry Reps. / NATO ACT) + Media
- **Why:**
  - First Military Additive Manufacturing event at the European level  
Insights into AM technologies, military use cases, and synergies  
between industry, military, and academia
  - **EDA and MLCC Exchange of Letters signature**, formalizing  
cooperation between the two entities
  - Promote AM technology for military use to higher level of visibility
- **When:**
  - 14 June 2023 (Wednesday)



# Multinational Logistics Coordination Centre (MLCC)

Additive Manufacturing Village 2023

## Distinguished Visitors' & Media Day

- Letter of Exchange Ceremony
- Guided Tour the Village
- Technical Briefings and Interviews





# Multinational Logistics Coordination Centre (MLCC)

Additive Manufacturing Village 2023

## Sum-up & First Impressions

- ✓ 320 registrations received / 230 approved
- ✓ 185 „Functionals“ / 35 Visitors daily
- ✓ 14 National delegations (Military & Military Academia) / 10 with deployed capabilities
- ✓ 14 Industry enterprises / 9 with deployed capabilities
- ✓ More than 60 use cases exercised through live trials and interactions
- ✓ Seminars outcomes as Concepts development
- ✓ Positive feedback from Military & Industry & Academia / willingness to continue
- ✓ 3 Nations are to join NATO SD 2.1084 Project (DEU, POL, SWE)
- ✓ Detailed Survey at the end of event / outcomes in next weeks
- ✓ Future events based on detailed Survey & internal MLCC analysis (suggestion every 2 years for AM Village)
- ✓ Distinguish between Expedient Repairs and BDR in future Project focus



- 57% Military
- 26% Industry
- 17% Academia



## NATO Smart Defence Projects

### MLCC role

- **NATO Department Head** for Logistics Education and Training
- **EU Discipline Leader** for Multinational Logistics Education and Training
- **Logistics Education, Training and Exercises provider**
  - ❖ Courses – e. g. JLSG HQ, RSOM, NLIC, NLOC, EU LOG Fundamentals + Operational Courses, LOGFAS courses
  - ❖ Exercises **Capable Logistician, Capable Deployer, Connected Logisticians**
- **Supporter of partner nations** (workshops, bilateral projects)
- Contributor to various LOG related projects and activities – **AM Village, OLCM, SMART ENERGY, DEEP, FNC-CL** etc.
- **Leader of NATO Smart Defence Projects (Logistics)**



## NATO Smart Defence Projects

### Aim

To promote and synchronize ideas for multinational cooperation in capability development through focused collaboration among nations, staffs and organizations

Custodian: HQ SACT Division of Defence Planning

- 76 Active Projects (Tier1 /43, Tier2 / 19, Tier3 /14)
- 55 Completed Projects / Proposals

### MLCC in lead

- 1.1113 International and Joint Logistics Centre
- 2.1081 MN LOG Partnership – MN Capabilities - Water production
- 2.1082 MN LOG Partnership – MN Capabilities - Water distribution
- 2.1084 MN LOG Partnership - Land Operations and Maintenance
- 2.1100 MN LOG Partnership – Deployable Ammunition Storage
- 2.1250 MN LOG Partnership/Lessons Learned and Best Practices



# Multinational Logistics Coordination Centre (MLCC)

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## SD 2.1084 Short Summary & Current Status

### CAPABLE LOGISTICIAN 2013 8 - 26 June 2013, MTA Lešť, Slovakia



CL13

Lead nation: CZE

Participation: 99 Pax, 70 EQ, 14 nations,

ODCRs: 5

### CAPABLE LOGISTICIAN 2015 1 - 26 June 2015, Bakony CTC, Hungary



CL15

Lead nation: SVN

Participation: 52 Pax, 22 EQ, 6 nations

ODCRs: 6

### CAPABLE LOGISTICIAN 2019 Roadmap to Logistics Interoperability Land Forces Training Centre Drawsko May / June 2019, Poland



CL19

Lead nation: NOR

Participation: 87 Pax, 50 EQ, 12 nations

ODCRs: 15

### CAPABLE LOGISTICIANS 2027 Roadmap to Logistics Interoperability



CL27

Lead nation:

Participation:

ODCRs:



## AM Village Edition 2.0

- **13 – 17 May 2024 AM Village 2024 in Tournai / BEL**
- Under the umbrella of the Belgium EU Presidency
- AM Village 2023 as blueprint for 2024
- Seminars, lectures, presentations, demonstrations and interactions
- Academia, Industry, Armed Forces
- 1<sup>st</sup> Preparation Meeting 20-21 February 2024 in Tournai / BEL
- 2<sup>nd</sup> Preparation Meeting 3-4 April 2024 in Prague / CZE



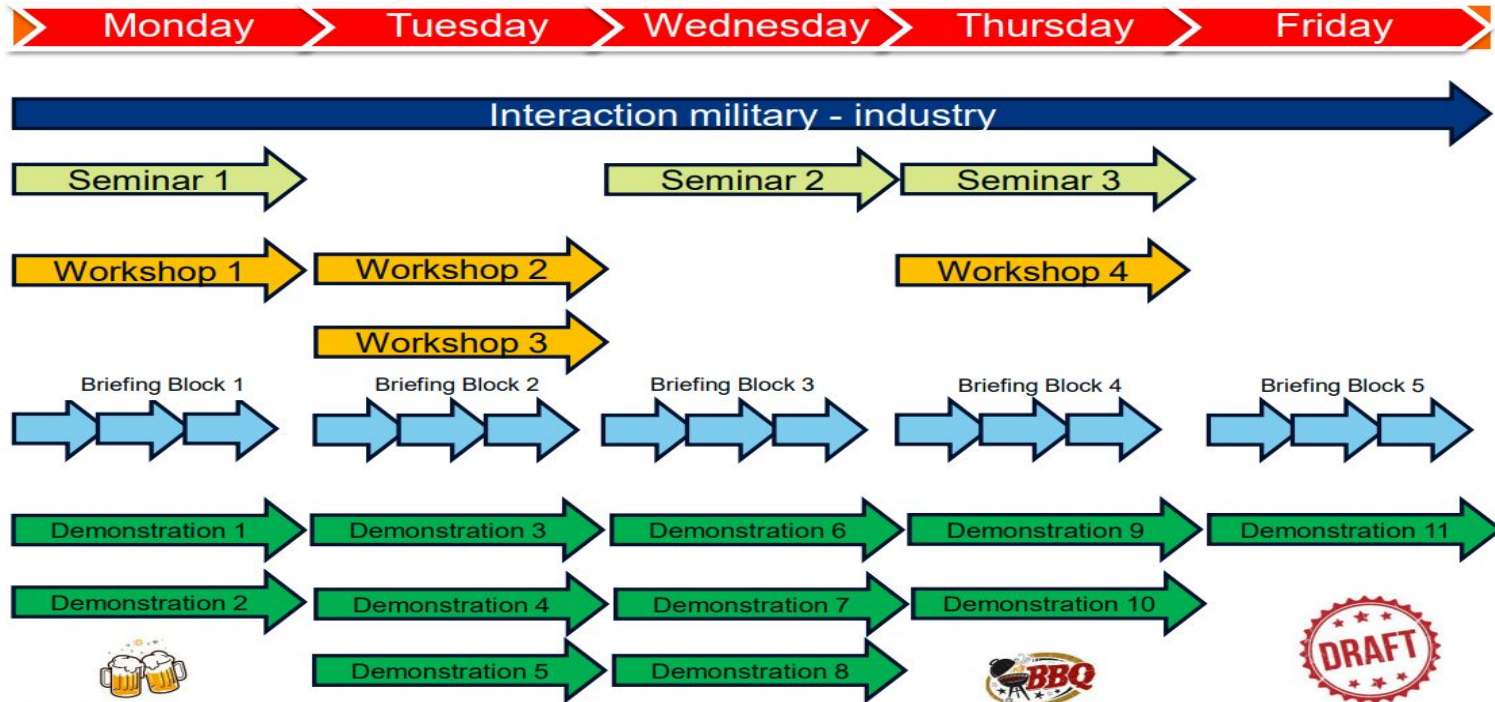




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## AM Village Edition 2.0 – Draft Agenda





## AM Village Edition 2.0 – Focus

1. Expedient Repairs
2. 3-D scanning
3. (Digital) AM process (end to end)
4. AM file sharing and handling
5. Education and Training
6. Potential of Materials
7. Domain Focus (maritime, army and air force)
8. Legal aspects
9. Reverse engineering
10. Certification and verification
11. Joined and combined interaction
12. AM Technologies & manufacturing methods





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## Questions?

<https://mlcc.army.cz>

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