

2021 Additive Manufacturing Workshop Overview

14 – 21 June

Virtual

Tracy Frost (OUSD Research & Engineering)/JAMWG

Marilyn Gaska (America Makes / Lockheed Martin)

Debbie Lilu (NCMS)

Ray Langlais (OSD MR / LMI)

2021 AM Workshop Protocol

- Please keep your phones on mute unless you are presenting. **Do NOT put your phone on hold.** Should you have to temporarily drop off please hang up and call back.
- Questions will be addressed via “Q & A” on AdobeConnect
- Presenters - slides will be advanced by NCMS / LMI
- This is an open forum. Slides will be posted on the AMMO WG at <https://ammo.ncms.org/>

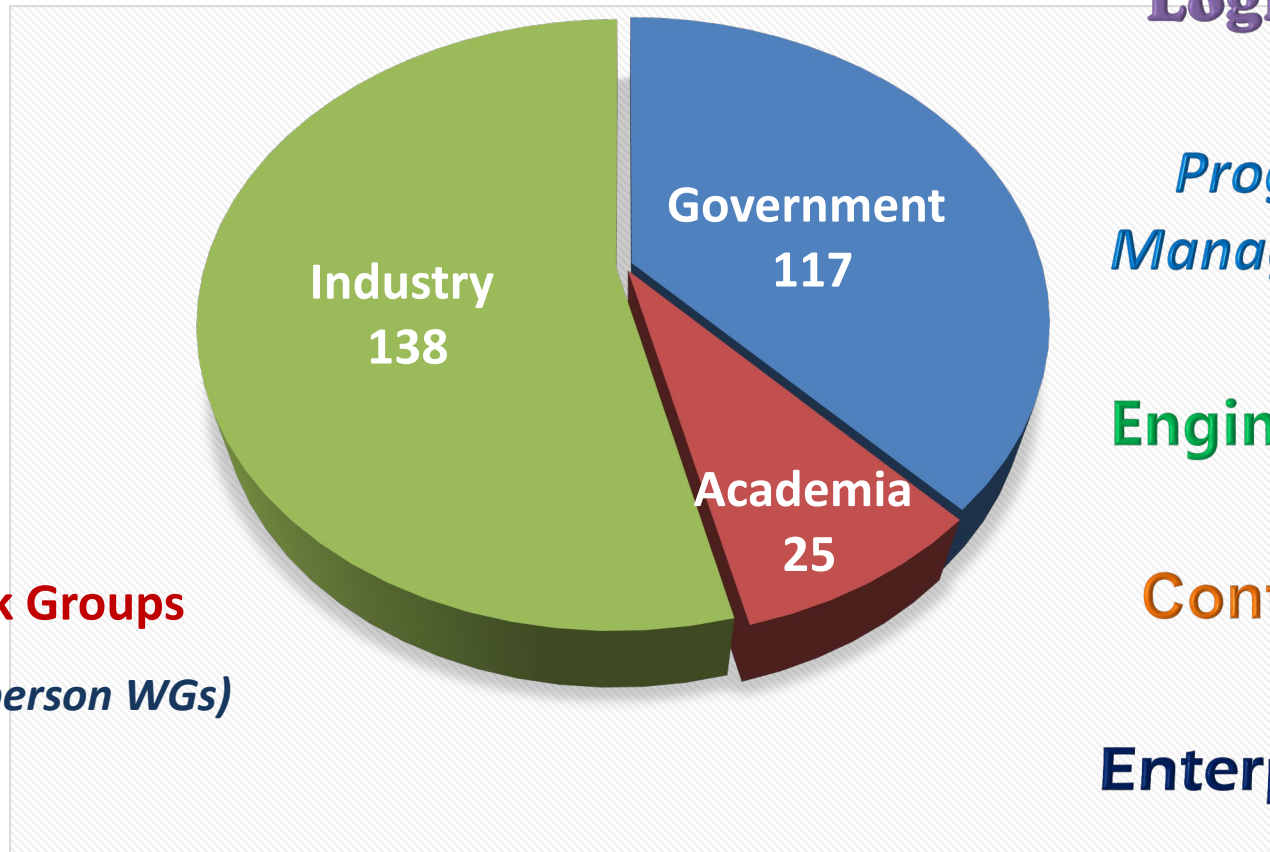
2021 Additive Manufacturing (AM) Workshop Overview

- Purpose: to address foundational aspects of additive manufacturing necessary for DOD-wide adoption of this capability
- Sponsored by DoD's Joint AM Working Group, America Makes AM for Maintenance and Sustainment Advisory Group, and the AM for Maintenance Operations (AMMO) Working Group
- 7th Year of annual AM wargame or workshop event
- Opportunity for government, industry, academia, and non-profit to actively participate in the workshop
- Over 280 people registered
- Working groups (20-50 people) will consist of seven key AM focus areas
- Working groups meet 4 hrs on Tuesday & Thursday
- “University Day” with optional sessions on Wednesday



280 Registrants

6 Disciplines



Legal

Logistics

Program Management

Engineering

Contracts

Enterprise IT

7 Work Groups

(20 – 58 person WGs)



2021 Additive Manufacturing Workshop



Robert A. Gold

Director
Technology & Manufacturing
Industrial Base
OUSD(R&E)

America Makes Distinguished Collaborator Award

The America Makes Distinguished Collaborator Award was established in 2014 to recognize individuals or organizations with an exceptional commitment and dedication to advancing additive manufacturing technology, practices, and innovation in the manufacturing industry. The recognized individuals or organizations are honored for cultivating effective collaborative relationships with academia, government, and industry, and contributing to the mission of America Makes.

America Makes Distinguished Collaborator
Award 2021 Recipient

- Greg Kilchenstein





2021 Additive Manufacturing Workshop



Dr. Vic S. Ramdass

Deputy Assistant Secretary of Defense
for Materiel Readiness

AGENDA

June 14 (Day 1)

1:00 – 3:00 pm Welcome and Opening Remarks

- AM Workshop Overview
- Mr. Rob Gold, Director, Technology & Manufacturing Industrial Base (OUSD Research & Engineering)
- Dr. Vic Ramdass (DASD Materiel Readiness)
- Working Group Introductory Briefs – Working Group Co-Leaders

4:00 – 6:00 PM Virtual “Happy Hour” hosted by Marilyn Gaska

AGENDA

June 15 (Day 2)

1:00 – 5:00 PM

Focused Facilitated Working Group
Sessions

June 16 (Day 3)

1:00 – 3:00 PM

University Day (Optional Sessions)

- 1-2 hour training or discussion session

June 17 (Day 4)

1:00 – 5:00 PM

Focused Facilitated Working Group
Sessions

AGENDA

June 21 (Day 5)

1:00 – 5:00 pm Overview from Planning Committee

- Working Group Outbriefs – Working Group Co-Leaders
- Closing Remarks & Discussion
 - Mr. Rob Gold
 - Workshop Planning Committee

2021 AM Workshop Working Groups (Tuesday & Thursday)

- Research & Development to Advance AM Qualification and Certification – Mark Benedict, Jennifer Wolk, Jeffrey Gaddes, Brandon Ribic
- Cybersecurity - Jon Powvens, Greg Shannon, Larry Lynch, Adwoa Amofa
- Common AM Data Package Approach (JAMA) – Edilia Correa, Tony Delgado, Michael Ridgway, Chris Babcock, David Wittes
- Education and AM Workforce Development - Josh Cramer

2021 AM Workshop Working Groups (Cont'd) (Tuesday & Thursday)

- AM Standards – Defense industry priorities and addressing the Research and Development gaps – [Jesse Chambers & Jim McCabe](#)
- Integrated AM Network Response – How industry and government can work together to respond to urgent and important needs – [John Wilczynski & Federico Sciammarella](#)
- AM Decision Making – Business Case Analysis for AM in the defense industry – [Stephen Kuhn-Hendricks, William Peterson, Ernesto Ureta, Timothy Vorakoumane](#)

2021 AM Workshop Optional Sessions (Wednesday)

- **One Size Doesn't Fit All: The Role for Technology in Meeting the Multiple Workforce Challenges in Manufacturing** – [Dr. Ben Armstrong \(MIT\)](#)
- **Training: JAMMEX Introduction (Gov't Only)** – [Catrina Murphy \(DLA\)](#) & [Vikas Sharma \(22nd Century\)](#)
- **DoD Additive Manufacturing Draft Guidebook Review** – [Michael Parkyn \(OSD R&E\)](#)
- **Cybersecurity in Manufacturing Workforce** – [Lizabeth Stuck \(MxD\)](#) & [Michael Gramoni \(Workforce Development\)](#)

2021 AM Workshop

Working Group Introductory Briefs

2021 Additive Manufacturing Workshop

Introduction

Research & Development to Advance AM Qualification and Certification

Co Leads:

Jennifer Wolk (jennifer.wolk@navy.mil)

Jeffery Gaddes (jeffrey.s.gaddes.civ@mail.mil)

Mark Benedict (mark.benedict.2@us.af.mil)

Brandon Ribic (Brandon.Ribic@ncdmm.org)

Research & Development to Advance AM Qualification and Certification

- **Objectives:**

1. *Identify gaps in tools, techniques, and technology relevant to qualification and certification*
2. *Identify impact to qualification time savings*
3. *Prioritize near term (2 years) and long term (5+ years) efforts to accelerate development in improved capability or efficiency for AM qualification*

- **Planned Deliverables**

1. *Identified gaps aligned with AM value stream elements*
2. *Interrelationships of gaps and qualification timeline impact*
3. *Prioritized near term and long term opportunities to realize improved capability and efficiency for AM qualification*

Research & Development to Advance AM Qualification and Certification

Members

First Name	Last Name	Organization
Jeswin	Joseph	Wichita State University - NIAR
Wayne	King	The Barnes Global Advisors
Andrew	Malek	Alchemy Industrial
Bob	Moriarty	Rolls-Royce
Cody	Goss	U.S. Army Corps of Engineers Engineer Research and Development Center
Ed	Herderick	The Ohio State University
John	Lewandowski	Case Western Reserve University
Juan Carlos	Cruz Robles	3D Systems Corporation
Scott	Taylor	Poly-Med
Steve	Immel	Sigma Lbs
Thomas	Butcher	ORNL
Yi	Zhang	Army Engineer Research and Development Center
Kate	Hyam	ASME
Michael	Gabertan	Defense Contract Management Agency
Peter	Daum	Rolls-Royce Corporation
Anton	Netchaev	USACE ERDC
Benjamin	Greene	Jacobs Technology Inc.
Bill	Macy	MACY CONSULTING INC
Brandon	Ribic	NCDMM

Research & Development to Advance AM Qualification and Certification

Members

First Name	Last Name	Organization
BRENTON	ORMSBY	Deloitte Consulting LLP
Brian	West	NASA
Fred	Higgs	Rice University
Jennifer	Wolk	Office of Naval Research
Justin	Ryan	Rady Children's Hospital San Diego; DICOM WG-17
Kaushik	Asokan	Flowserve
Keith	Sharp	UMaine Advanced Structures and Composites Center
Ken	Hix	GE Aviation
Margaret	Balanowski	US Army
Michael	Tucker	GE Research
Mike	Vasquez	3Degrees
Nathaniel	Craig	Army National Guard-G4
Paul	Miller	ANSYS
Radhika	Barua	Virginia Commonwealth University
Ricky	Murphy	Department of Defense
Robert	Grant	Federal Aviation Administration
Roger	Narayan	North Carolina State University at Raleigh
Scott	Nelson	UT-Battelle (Oak Ridge National Laboratory)
Shaw	Feng	NIST
William	Beckenbaugh	WMB Consulting, LLC.

2021 Additive Manufacturing Workshop

Introduction

Cybersecurity Working Group: From Current to Future State

Co Leads:

Jon Powvens (Jon.Powvens@mxdusa.org)

Greg Shannon (Gregory.Shannon@cymanii.org)

Larry Lynch (Larry.N.Lynch@usace.army.mil)

Adwoa Amofa (adwoa.a.amofa.ctr@mail.mil)

Cybersecurity Working Group: From Current to Future State

Objectives:

1. *Identify and document current cybersecurity baseline across the DIB, i.e., best practices, lessons learned, and gaps.*
2. *Identify current and future cybersecurity R&D.*
3. *Inform future cybersecurity roadmap activities to enhance cybersecurity across the DIB.*
4. *Traditional, existing approaches to cybersecurity manufacturing are **often outdated** and not pervasive, not resilient and are expensive and obtrusive.*
5. *The **biggest challenge** is to see where we are succeeding and expanding on that.*
 - a. *Example: Two-factor authentication has gotten usable and scalable allowing for automatic updating and is common for many consumer products.*

Planned Deliverables:

1. *Whitepaper describing the current DIB cybersecurity baseline to include technology/capability gaps.*
2. *Recommendations on future R&D activities.*
3. *We, in the cybersecurity community, owe our customers and stakeholders a **PURE cybersecurity method: Pervasive, Unobtrusive, Resilient/reliable, and Economical/efficient.***

Cybersecurity Working Group: From Current to Future State

Steps to Achieve Objectives:

1. *Day 2 presentations will be provided during the working group from hardware vendors and organizations involved with cybersecurity assessment, implementation and training. A roundtable discussion with work shop participants will be used to identify the current state.*
2. *Day 4 presentations will be provided MxD and CyManII discussing their current and future R&D efforts to include their technology/capability roadmaps. A roundtable discussion will be conducted allowing participants to comment on the efforts as well as provide insights into on-going R&D being conducted by their organization.*
3. *The information gained in the roundtable discussions will be used to produce the final deliverables.*

Questions Towards Achieving Objectives:

1. *How do we **make industrial cybersecurity viable** for cybersecurity-capability-challenged manufacturers? E.g., small and medium manufacturers?*
2. *Are the **recommended/required controls effectively applied** in practice? (E.g., they prevent easy-adversary successes)*
3. *What are the “carrots” that **DOD/USG can offer manufactures**?*

Cybersecurity Working Group: From Current to Future State

Working Group Attendees

Adwoa Amofa	OUSD(R&E) Manufacturing Technology	Doug McCue	MCSC AMOC
Alyson Coates	ORNL	Duncan Gibbons	Stellenbosch University
Amber Cassady	Lewis-Burke Associates LLC	Ed Pierson	Lockheed Martin Space
Anaiz Quinones	USMC DCI IC4	Ericson Palermo	DCMA
Andrew Glendening	NASA, Goddard Space Flight Center	Federico Sciammarella	MxD
Anna Carlson	NAVAIR	Greg Shannon	CyManII
Ayca Ertekin	Lockheed Martin	Guillermo Riveros	US Army Engineer Research and Development Center
Berardino Baratta	MxD	Herbert Doty	General Motors
Brandon Phillips	DEVCOM Aviation & Missile Center	Howard Grimes	CyManII
Carl Thompson	Sigma Labs Inc.	Ian Harris	University of California Irvine
Carolyn Fairbanks	US Nuclear Regulatory Commission	Jacob Rome	The Aerospace Corporation
Brandon Wegge	Boeing	James Stinson	USACE ERDC ITL
Catrina Murphy	Defense Logistics Agency	Jeffrey Gaddes	US Army DEVCOM AvMC
Celia Paulsen	NIST MEP	Ken Fowler	CyManII
Christine Myers	NAVAIR	Kirsten Hatler	
Curtis Frederick	Carl Zeiss	Kyle Joffrion	RIA-JMTC

Cybersecurity Working Group: From Current to Future State

Working Group Attendees (Cont.)

Kyle Hedrick	DLA
Larry Lynch	OUSD(R&E) Manufacturing Technology
Marilyn Gaska	Lockheed Martin
Marion Stephens	DoD
Michael Mullins	NC State University
Michael Taylor	NIST MEP
Nick LaJeunesse	Markforged
Philip Smith	US Army Ground Vehicle System Center
Ram Shetty	OPEX Systems LLC
Robert Grubbs	Idaho National Lab (INL)
Robert Yancey	Hexcel
Ryan Frankle	NAVAIR
Sarah Jordan	Fabrisonic LLC
Scott Deutsch	NCDMM
Steven Richard	NIWC PAC (Alutiiq)

Susan Moehring TechSolve, Inc.

Timothy Roach RIA-JMTC

Cybersecurity Working Group: From Current to Future State

Meeting / Call-In Information

- **Cybersecurity:**
 - <https://connect.apan.org/amcyber>
 - (312) 757-3121 Access Code: 446-676-645

2021 Additive Manufacturing Workshop

Introduction

JAMA AM DATA PACKAGE

Leads:

Edilia Correa (Edilia.Correa@dla.mil)

Tony Delgado (Luis.Delgado@dla.mil)

Michael Ridgway (miridgway@deloitte.com)

Chris Babcock (cbabcock@deloitte.com)

David Wittes (dwittes@deloitte.com)

JAMA AM Data Package Workgroup Objective and Planned Deliverable

Objective:

- *Capture participant input to refine the Common JAMA AM Data Set risk categorization, content, structure, and formatting*

Planned Deliverable:

- *List of recommendations to refine the Common JAMA AM Data Set risk categorization, content, structure, and formatting*

JAMA AM Data Package Agenda

Agenda:

Date	Time (EDT)	Topic	Leads
Tuesday June 15th	1300 – 1315	Workshop Introduction	Edilia Correa Tony Delgado Michael Ridgway Chris Babcock David Wittes
	1315 – 1500	AM Risk Categories and AM Data Set Content Requirements	
	1500 – 1530	Discussion Time	
Thursday June 17th	1300 – 1400	AM Data Set Structure	(See June 15th above)
	1400 – 1500	AM Data Set Formatting and Workshop Conclusion	
	1500 – 1530	Discussion Time	

JAMA AM Data Package Agenda

Members

First Name	Last Name	Organization
Thomas	Barrett	Deloitte
Michael	Baughman	General Electric
Mark	Benedict	AFRL
Ryan	Blake	Boeing Global Services
Kyle	Cobb	NAVAIR
Peters	Elisa Beth	NAVAIR
Matthew	Fiedler	re:3D Inc.
Ryan	Gelotte	Action Engineering, LLC
Joy	Gockel	Wright State University
Aman	Gupta	22nd Century Technology Inc

JAMA AM Data Package Agenda

Members

First Name	Last Name	Organization
Lauren	Hanyok	NSWCCD
Kyle	Hedric	Defense Logistics Agency
Mahdi	Jamshidinia	ASTM International
James	Kennedy	US Army
Eric	Kirchner	D&G supporting DLA R&D
John	Milewski	APEX3D LLC
Melany	Mioduszewski	Parsons
Judith	Molina	LMI Government Consulting HQDA G-4, Field Maintenance Division
Josh	Moser	NAVAIR

JAMA AM Data Package Agenda

Members

First Name	Last Name	Organization
Kristin	Mulherin	Dyndrite
John	O'Brien	HAMR Industries
Brenton	Ormsby	Deloitte
Philip	Radliff	Defense Logistics Agency
Kelsey	Rainey	GE Additive
Philip	Riegler	Norsk Titanium US
Richard	Russell	NASA
John	Schmelzle	NAVAIR
Brian	Seekatz	US Coast Guard
Samantha	Snabes	re:3D Inc.

JAMA AM Data Package Agenda

Members

First Name	Last Name	Organization
Scott	Tomlinson	The University of Maine
Paul	Tykodi	Tykodi Consulting Services LLC
Scott	Verden	Siemens
Kelly	Visconti	PM2 Strategies
Justin	Whiting	NIST/Georgetown University
Ian	Wing	Deloitte
Dan	Yang	GE

JAMA AM Data Package Working Sessions

Both working sessions will be held on Zoom for
Government

Meeting / Call-In Information

- **AMMO JAMA AM Data Package Working Sessions 1 & 2:**
 - **URL:**
<https://deloitte.zoomgov.com/j/1614095919?pwd=MFFkVjd5VGdOQXJMTDB5SEYzUkl nZz09;>
 - **Phone #:** 1 669 254 5252 , **Meeting ID #:**161 409 5919, **Password:** 890321

2021 Additive Manufacturing Workshop

Introduction

Education and Workforce Development

Co Leads:

Josh Cramer (josh.cramer@ncdmm.org)

Michael Britt-Crane (michael.d.britt-crane.civ@mail.mil)

Karla O'Conner (Karla.OConnor@dau.mil)

Education and Workforce Development

- **Objectives:**

1. *Instructor led training on the utilization of Additive MFG technologies in various manufacturing settings.*
2. *Participants will engage in an interactive training session exploring streamline the manufacturing process, improve product life cycles, and allow for mass customization, which can lead to improved profitability*
3. *Participants will work collaboratively and with a virtual coach to build business case scenarios specific to their roles, technologies, and facilities*

- **Planned Deliverables:**

1. *Participants will build detailed action plans leading to business case scenarios to depoy within their roles/companies in successful integration of additive manufacturing*

Education and Workforce Development

Members

- Angela Trego – UAMMI
- Kris Ward – SME
- Mara Hitner – MatterHackers
- Pamela Szmara – Pamton 3D Printing
- Tiffany Lindemann – US NAVY
- Enora Rogers – 3D Printing Corporation
- Cindy Waters – Naval Surface Warfare Center
- Benjamin Eilers – DEVCOM CBC
- Paul Bates - ASTM
- Mark Pankow – USG
- Kim Kish – USAF
- Rich Lonardo – Defense and Energy Systems
- Hunter Smith – Naval Information Warfare Center
- Max Gilleland – DeAnza College
- Michael Nikodinovski – US ARMY
- Michael Pecota – Perrygo Consulting
- Peter Bruno – University of Pennsylvania

Education and Workforce Development

Meeting / Call-In Information

- **Tuesday June 15th: ILT Training**
 - URL: Zoom – participants have been emailed -- <https://zoom.us/j/93893374678>
 - Phone # +1929-205-6099 Code: 93893374678#
- **Wednesday June 16th: Individual Coaching**
 - URL: will be unique to every participant requesting
 - Phone # :will be unique to every participant requesting
- **Thursday June 17th: Share Session**
 - URL: MS Teams – participants have been emailed – [Click here to join the meeting](#)
 - Phone # +1 412-664-5181 Code: 308608451#

2021 Additive Manufacturing Workshop

Introduction

AM Standards

Co Leads:

Jesse Chambers, DSPO (Jesse.Chambers@dla.mil)
Jim McCabe, ANSI (jmccabe@ansi.org)

AM Standards – Meeting Goals

- **Objectives**

1. *Determine defense industry AM standardization priorities (Day 1)*
2. *Make recommendations for addressing the Research and Development gaps (Day 2)*

- **Planned Deliverables**

1. *Identify the top 5-10 defense industry standards gaps in the ANSI and America Makes AMSC Standardization Roadmap for Additive Manufacturing (Day 1)*
2. *Develop a Statement of Objective (SOO) for the top gaps and how they can best be addressed through R&D projects (Day 2)*

AM Standards - Introductions

Members

- Kareen Aggour, GE Research
- Jeffrey Aguiar, Lockheed Martin
- Muhammad Ali, HP
- Rachael Andrulonis, WSU NIAR
- Kyle Applen, Combat Capabilities Development Command Chemical Biological Center
- Jesse Chambers, DSPO
- David Cohen, VCU
- Scott Crynock, America Makes
- Laura Feix, AMPP
- Elton Freeman, ERDC
- Fred Herman, SHEPRA
- Adam Hicks, AFRL/RXMS
- Ben Kassel, LMI
- Robert Lopez-Anido, Univ of Maine
- Jim McCabe, ANSI
- Michael Monaghan, Army Futures Command
- Alison Park, NASA
- Matthew Spiret, Markforged
- Kate Thorn, NAVAIR
- Joseph Ullman, NAWCAD-Materials Engineering Division
- Matt Westman, 3D Systems
- Richard Wimberly, USMC

AM Standards

Meeting / Call-In Information

- **Day 1 (June 15):**
 - <https://goansi.webex.com/goansi/j.php?MTID=m5ba9e23a99078603f4d6893b59a60364>
 - 1-866-469-3239; Access code: 172 281 3119; Password: NPrkxCwy333
- **Day 2 (June 17)**
 - <https://goansi.webex.com/goansi/j.php?MTID=m93f7dc02cba80fe7bab623ed2c6c00b7>
 - 1-866-469-3239; Access code: 172 399 5235; Password: yWapCgB8B43

2021 Additive Manufacturing Workshop

Introduction

Integrated Additive Manufacturing Network Plan

Co Leads:

John Wilczynski (John.Wilczynski@ncdmm.org)
Georgette Nelson (georgette.nelson@ncdmm.org)
Berardino Baratta (Berardino.Baratta@mxdusa.org)

Integrated Additive Manufacturing Network Plan

- **Objectives:**

1. *Demonstrate the Advanced Manufacturing Crisis Production Response (AMCPR) Program*
2. *Identify gaps in the Program's capabilities as a crisis management system*
3. *Engage with the AM Ecosystem to prioritize program objectives and sustainment*

- **Planned Deliverables**

1. *Prioritize capabilities most needed in an online 3D Model Repository and Exchange Platform*
2. *Identify necessary micro-learnings to reskill and upskill our Workforce*
3. *Understand and identify the value levers of a crisis management system for various stakeholders*
4. *Prioritize capability expansions and identify mechanisms to mitigate product risk*
5. *Identify and prioritize regulatory challenges and obstacles*

Integrated Additive Manufacturing Network Plan

Members

First Name	Last Name	Organization
Ron	Robinson	3D PRINTER TECHNOLOGY - ADDITIVE MANUFACTURING LABS
Major Timothy	Otto	9th Communications Battalion
Alex	Steeb	America Makes / NCDMM
Debbie	Holton	ASME
Lauralyn	McDaniel	ASME
Michael	Kottman	ASTM
Michael	Monaghan	Aviation Enablers - Requirements Determination Directorate, Aviation, CDID, Army Futures Command
Ralph	Resnick	c3 Consulting
James	Schwei	DCMA
Frank	Covino	Deloitte
Aileen	Richardson	Deloitte
Ian	Wing	Deloitte Consulting
Magdalene	Fogarasi	FDA
Karla	O'Connor	FEMA - DAU
Mark	Shaw	GE Additive
Lauren	Tubesing	GE Additive
Dave	Chapin	GE Additive
Peter	Koudal	GE Research
Kareem	Aggour	GE Research

Integrated Additive Manufacturing Network Plan

Members

First Name	Last Name	Organization
Jaron	Bass	International Trade Administration
Glenn	Richardson	Jobs Ohio
Chip	Tomonto	Johnson & Johnson
Bernice	Aboud	Johnson & Johnson
Marilyn	Gaska	Lockheed Martin
William	Mooney	Lockheed Martin
Prabhjot	Singh	Lockheed Martin Space
Markus	Reiterer	Medtronic
Ken	Warnock	Medtronic
Petra	Mitchell	MEP / Catalyst
Jose	Colucci-Rios	MEP Resource Manager
Anita	Balachandra	MEP Resource Manager
Federico	Sciammarella	MxD
Berardino	Baratta	MxD
Meghan	McCarthy	National Institute of Allergy and Infectious Diseases
Phil	Cruz	National Institute of Allergy and Infectious Diseases
David	Coyle	NAVSUP
Johannes	Schonberg	Navy
Bryce	Weber	Navy
Jason	Fox	NIST

Integrated Additive Manufacturing Network Plan

Members

First Name	Last Name	Organization
Jennifer	Marshall	NIST
Lewis	Shattuck	NUWC Newport AM Lead
Paul	Huang	Office of Naval Research
Rob	Gold	OSD
Gregory	Kilchenstein	OSD Mx
Christina	Maranto	PM2 Strategies
Jim	Knotts	Quotient Inc
Michael	Schall	Quotient, Inc.
Samantha	Snabes	re:3D
Mona	Esfahani	Relativity Space
Randy	Langmead	Siemens
David	Rooy	Siemens
David	Sheely	U.S. Air Force Sustainment Center
Joseph	Gross	US Army Geospatial Center
Ryan	Vega	Veterans Health Affairs
Beth	Ripley	Veterans Health Affairs
David	Cohen	Virginia Commonwealth University

Integrated Additive Manufacturing Network Plan

Meeting / Call-In Information

- Link: https://teams.microsoft.com/l/meetup-join/19%3ameeting_OTg4ZWExYzMtOTk1NC00MzdiLThkYmMtODAwZDI3ZmYxODk4%40thread.v2/0?context=%7b%22Tid%22%3a%22783fab6c-a027-4403-9c11-84966d970173%22%2c%22Oid%22%3a%229bb7cce0-6e6a-4c0e-96ee-da2cea4f5544%22%7d
- Call-In Number: 412-664-5181
- Code: 764 989 105#

2021 Additive Manufacturing Workshop

Introduction

AM Decision Making: AM Business Case

Co Leads:

Stephen Kuhn-Hendricks, PhD (stephen.kuhn-hendric@navy.mil)

William Peterson (william.t.peterson2@navy.mil)

Ernesto Ureta (ernesto.ureta@navy.mil)

Timothy Vorakoumane (timothy.vorakoumane@navy.mil)

AM Decision Making: AM Business Case

- **Objectives:**
 1. *Define equations of the AM business case*
 2. *Identify business data opportunities and challenges*
 3. *Address the influence of AM use cases on the business case*
- **Planned Deliverables:**
 1. *Draft business case equations*
 2. *Mathematical frameworks for objective evaluation of business case*

AM Decision Making: AM Business Case

Members

- | | | | |
|--------------------------|---------------------|------------------------|---------------------|
| • Stephen Kuhn-Hendricks | NAVSUP | • Douglas Freitag | Bayside Materials |
| • William Peterson | NAVSUP | • Mohsan Haider | Lockheed Martin |
| • Ernesto Ureta | NAVSUP | • Lisa Kilday | DLA |
| • Timothy Vorakoumane | NAVSUP | • Donald Godfrey | SLL Solutions |
| • Richard Huff | ASTM | • Cesar Terrazas | W.M. Keck Center |
| • Thomas Barrett | Deloitte | • David Busby | MDA |
| • Laurel Cooper | Deloitte | • Margo Sobers | USfalcon |
| • Ling Xu | NAVAIR | • Michael Sander | AFLCMC |
| • Alan Pentz | NAVAIR | • Todd Spurgeon | America Makes |
| • Anna Safigan | NAVAIR | • Darin Thomas | EXO-Sight |
| • Stephanie Smiros | OPNAV | • Dian Chen | Lockheed Martin |
| • Peter Bradley | AMT | • Jason McCurry | REACT |
| • Dustin Hitt | Parker Hannifin | • Jim Hartnett | Moog |
| • Elton Freeman | Engineer R&D Center | • Niall O'Dowd | Additive Monitoring |
| • Jack Graham | Raytheon | • Ray Langlais | LMI |
| • Nicole Santos | Ascend | • Kevin Johnson | HQDA |
| • Sunita Chavan | USAF | • Gerry Hurley | RIT |
| | | • Jill Barker-Standish | Walnut Creek |

AM Decision Making: AM Business Case

Meeting / Call-In Information

- **AM Business Case**
 - Adobe Connect (Visuals): <https://connect.apan.org/metrics1/>
 - Conference Line (Audio): 301-909-7350 (Pass: 628922741#)

2021 AM Workshop Virtual Social

- Hosted by Marilyn Gaska, Lockheed Martin and the America Makes Maintenance & Sustainment Advisory Group
- When: Monday, June 14, 2021 4:00 PM-6:00 PM (UTC-05:00) Eastern Time (US & Canada).
- Where:
<https://lmco.zoomgov.com/j/1615244384?pwd=cUdWcjROThhwL3VWVHZBb1lrNVRJZz09#success>

AM Workshop Points of Contact

NCMS Event Support
EventSupport@ncms.org

Debbie Lilu
Debbie.Lilu@ncms.org
(734) 262-0758

Ray Langlais
rlanglais@lmi.org
(571) 633-8019

2021 Additive Manufacturing Workshop Overview

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Back-Ups

Research & Development to Advance AM Qualification and Certification

Abstract: The intent of this working group is to outline opportunities for strategic research and development (R&D) to address gaps in additive manufacturing (AM) Qualification and Certification (Q&C). The workshop has historically served as an important opportunity to influence focus and prioritization for funded R&D activities. The working group will include reference materials and presentations to aid brainstorming and understanding of AM Q&C as well as examples of ongoing relevant efforts. The goal of the working group is to identify and develop near term and long-term plans to address gaps in AM Q&C via R&D.

Cybersecurity

Abstract: This working group will focus on what industry, academia and manufacturing USA institutes are doing to help solve the current issues facing DoD today and what will need to be done to ensure a more secure tomorrow. Presentations/ Discussions/Tabletop scenarios will help shape the dialogue over the two days with action items to ensure continued progress towards the common goal of securing America's supply chains and the Defense Industrial base. Participants will engage with MxD and CyManII to inform national roadmaps for cybersecurity in manufacturing.

Education and AM Workforce Development

Abstract: This two-part training/workshop first offers participants a highly interactive, virtual learning experience where the instructor will demonstrate effective approaches in communicating to decision-makers how additive manufacturing technologies can streamline the manufacturing process, improve product life cycles, allow for flexible mass customization, and lead to increased productivity and profitability. In the second part, participants will apply this new knowledge and write their own business case. Coaches are available to help participants hone their messages into a solid, compelling business case. Participants will also have access to America Makes technical business cases. At the workshop's conclusion, students will present their business cases to the group and receive feedback and ideas for improvement.

AM Standards – Defense industry priorities and addressing the Research and Development gaps

Abstract: During this session, the 93 additive manufacturing standards gaps of the ANSI AMSC and America Makes Standardization Roadmap for Additive Manufacturing will be reviewed to prioritize the open gaps based on defense industry needs. Group members will then develop Statement of Objective for the top gaps and how they can best be addressed through R&D projects.

Integrated AM Network Response – How industry and government can work together to respond to urgent and important needs

Abstract: This working group will discuss and document areas where additional investment and development is required to ensure a resilient supply chain. The working group will investigate and provide recommendations for the following areas to focus around scaling and exercising capabilities:

- Platform Improvement & Sustainment -- Evolve the enabling technology platform
- Capability Expansion – Expand AM technologies and develop program capabilities
- Ecosystem Cultivation -- Empower, grow, and mobilize stakeholders
- Regulation & Policy Management
- Workforce Development

AM Decision Making – Business case analysis for AM in the defense industry

Abstract: Decision making for AM in the DOD is a balance between the engineering feasibility of producing a part via AM (“can we”) and the business case for AM production (“should we”). In this working group, we will attempt to formally define (i.e. equations) the AM business case by considering the potential ramifications of AM across the supply chain. After critically evaluating draft definitions, we will discuss opportunities and challenges for quantifying each component. Specifically, we will identify critical pieces of data and address how various AM use cases will influence the business case. Next, we will present views on the AM business case from representatives across the Military Services and commercial partners in regards to their current view of the AM business case, considerations specific to their organization, and vision of the AM business case in a full AM capable DOD. Lastly, the group will discuss next steps to establishing a standardized DOD perspective of the AM business case.

AM Acceptability: Common AM Data Package Approach (Tuesday Only)

Abstract: This working group will provide participants a review of the Joint AM Acceptability (JAMA) project and seek feedback on the project's approach. The JAMA effort was a collaboration between the Military Departments (MILDEPS) and the Defense Logistics Agency (DLA) to meet the Office of the Secretary of Defense's mandate to integrate AM into the supply chain. The DLA and MILDEP partners developed a common AM Data Package approach which will be discussed in depth during the workshop.

One Size Doesn't Fit All: The Role for Technology in Meeting the Multiple Workforce Challenges in Manufacturing (Wed)

Abstract: U.S. manufacturers continue to be challenged in finding the right workers with the right skills. Today, research from MIT's Initiative for Knowledge and Innovation in Manufacturing argues that manufacturers are facing not one, but a set of related workforce challenges: a "skills shortage", a "skills gap", and a "wage gap." In this presentation, MIT Research Scientist Dr. Ben Armstrong will detail these workforce challenges, provide a roadmap to creating scalable and sustained solutions, and describe the role that policy and acquisition strategy plays in moving forward. Dr. Armstrong will provide examples of what some of the most advanced factories have done to address these challenges as evidence to the viability of his proposed approaches.

Training: JAMMEX Introduction (Gov't Only) (Wed)

Abstract: JAMMEX is the collaborative system for the exchange and sharing of 3D AM models across the DoD community. JAMMEX fulfills the requirement of the OSD DTM-19-006 to provide an interoperable capability enabling DoD entities to procure, securely access, and share AM technical data.

This workshop session will provide participants with a demonstration of the current functionalities of JAMMEX. Participants will hear highlights about some of the system enhancements that are currently being worked. The discussion will also involve an exchange of ideas and feedback from the participants on lessons learned from working with AM repository systems and further suggested enhancements for JAMMEX.

DoD Additive Manufacturing Draft Guidebook Review (Wed)

Abstract: In this session on the draft DoD AM Guidebook, a discussion started at the 2020 workshop, participants will have an opportunity to learn more about the status and plans of this intended guide as well as how to contribute to its development. The guidebook is intended to be a resource to assist with holistically implementing AM across the DoD in acquisition, technology development and application, engineering, and logistics. More details to follow.

Cybersecurity in the Manufacturing Workforce (Wed)

Abstract: With the COVID-19 pandemic in 2020 came a blitz of new and urgent concerns over cybersecurity. Manufacturing's growing reliance on automation, advanced control systems, and remote work only expands the attack surface for cyber criminals. The Hiring Guide: Cybersecurity in Manufacturing is a playbook for building that urgently needed workforce. It describes 247 job roles; recommends how to train and upskill workers to handle these jobs; and breaks out detailed descriptions for three specific roles crucial to the future of cybersecurity. This presentation will highlight some of the most critical pathways and opportunities described in this detailed document with examples of execution (i.e. CyMOT). Participants should review documents. The goal is to determine what are the critical roles to ensure AM has a ready workforce as it relates to cybersecurity.