

# Canadian Advanced Manufacturing in Nuclear Alliance (CAMiNA) Terms of Reference

The **Canadian Advanced Manufacturing in Nuclear Alliance (CAMiNA)** is an independent organization consisting of representatives from the Canadian nuclear industry including utilities, suppliers, research bodies, universities and government entities convened to promote greater use Advanced Manufacturing technologies in the Canadian nuclear industry. The CAMiNA will serve as a voice to advocate for research, development, and application of various Advanced Manufacturing technologies to maintain or improve to the cost, reliability and safety performance of Canada's nuclear industry including the operating CANDU fleet and future SMR deployments. "The CAMiNA will initially focus on Additive Manufacturing, and it will expand its scope to other Advanced Manufacturing technologies in support of its members' priorities."

There is an increasing need to replace certain ageing or obsolete components in Canada's nuclear facilities. Many of these facilities, including CANDU nuclear power plants were built with components or equipment supplied by companies that are no longer in business or do not produce the same component. Replacing such obsolete equipment requires expensive engineering changes to find a part of equivalent function while satisfying safety and performance requirements. Reverse engineering of obsolete components can enable these components to be cost-effectively "printed" or produced by conventional means using moulds "printed" from computerized models created by either 3D scanning or other methods. A supplier base with advanced manufacturing capability can also complete in-situ repairs and applying protective coatings to ensure longer component life.

Advanced Manufacturing (AM) can also be used to make complex and intricate components for Small Modular Reactors (SMRs) that were heretofore beyond the reach of conventional manufacturing or make larger components faster and cheaper than by conventional methods. These AM features combine to promise cost and schedule reductions and enable optimized design features that can help make SMRs more cost-competitive with other forms of energy production. Investing in AM will help make Canada a leader in both domestic and international SMR deployments.

OCNI, KSB, and Kinectrics have collaborated to produce the "<u>Advanced Manufacturing Roadmap for the</u> <u>Canadian Nuclear Industry</u>" which was officially released on January 12, 2022. The Advanced Manufacturing Roadmap provides a comprehensive overview of the current status of Advanced Manufacturing development and its application in the nuclear industry, outlines short-term goals for 2022, and sets out a vision for ten years and beyond. The AM Roadmap lays out a high-level plan on how to develop advanced manufacturing capacity in the nuclear supply chain and highlights some of the ongoing projects in nuclear advanced manufacturing.

The AM Roadmap calls for the formation of a "Canadian Advanced Manufacturing in Nuclear Alliance" that will convene on a regular basis to share experience, discuss manufacturing challenges, review R&D programs, and seek collaboration opportunities that will encourage adoption of Advanced Manufacturing technologies in the Canadian nuclear industry.



## 1. Mandate

The mandate of the CAMiNA is to promote greater use Advanced Manufacturing technologies in the Canadian nuclear industry. This includes:

- Increasing industry awareness of the benefits to be derived from greater use Advanced Manufacturing technologies in the Canadian nuclear industry;
- Convening industry workshops at which participants share experience on various applications of Advanced Manufacturing technologies, learn about new developments in the field, discuss manufacturing challenges, review R&D programs, and seek collaboration opportunities;
- Briefing Canadian nuclear industry stakeholders on the advantages of advanced or additive manufacturing in helping to sustain Canadian nuclear facilities including the CANDU fleet until 2065 and beyond and enabling Canada to be a leader in SMR development and deployment;
- Convening bi-monthly meetings to share experience, discuss manufacturing challenges, review R&D programs, and seek collaboration opportunities;
- Seeking meaningful joint R&D activities, and a means of funding for initiatives that will advance the Canadian industry in the area of nuclear advanced manufacturing;
- Advising and consulting with governments, regulations, and standards bodies on regulations and standards that impact the implementation of advanced or additive manufacturing technologies.

## 2. Management and Oversight

The CAMiNA will be managed by a part-time **Program Director** assigned by OCNI. The CAMiNA Program Director will report to an **Executive Committee** comprised of representatives from the developers of the AM Roadmap, including OCNI, KSB, and Kinectrics.

The CAMiNA will appoint a **Chair** on a rotating basis (3 year term) who is a senior Canadian nuclear industry representative selected by the CAMiNA Executive Committee. The Chair will have an honorary role and would not be responsible for the day-to-day operations of CAMiNA.

## 3. Membership

- 3.1. Membership of the CAMiNA will include but not be limited to
- Members of the Canadian nuclear supply chain
- Nuclear utilities and licensees
- Nuclear laboratories
- SMR Developers and partner organizations
- Academia including Universities, Colleges, and Technical Schools
- Standards Associations
- Advanced Manufacturing consultants service providers



- Government economic development agencies and related governmental bodies
- Innovation hubs, incubators, and related organizations
- 3.2. Application form to be maintained by the Program Director, and posted on the CAMiNA webpage. Potential members must submit the completed application form. Membership will be granted, except under limited circumstances on a case by case basis, upon recommendation by the Program Director and final decision by the Executive Committee.
- 3.3. Benefits of joining:
- Networking
- Access to expertise and resources
- Meeting other members and CAMiNA collaborators
- Identify and develop collaboration opportunities
- Stay informed on recent developments
- Visibility for your organization's activities
- Regular meetings with members
- Involvement in CAMiNA events, including input on topics and speaking opportunities
- Provide input into CAMiNA's evolution

3.4. Expectations of members:

- Be an active participant
- Share information about your activities, your knowledge and expertise (do not share confidential information)
- Promote CAMiNA and grow membership
- No solicitation as part of CAMiNA activities

#### 4. Operations

The CAMiNA Program Director will arrange regular meetings of the CAMiNA members (~6 times per year) in pursing the CAMiNA Mandate as set out in Section 1.0, and will pursue CAMiNA events and workshops (stand-alone or attached to existing events), and identifying new opportunities to enhance deployment of AM in Nuclear.

#### 5. Communications

The CAMiNA Program Director in consultation with the Executive Committee will pursue communications activities, including but not limited to:

#### 5.1. Maintaining the CAMiNA webpage on OCNI.ca

5.2. Issuing regular news releases



- 5.3. Quarterly CAMiNA Newsletters covering relevant advanced or additive manufacturing topics including:
- Advances in AM research and development
- Successful application of AM in other industries
- New applications of AM in nuclear
- Updates on AM standards
- Updates on AM prototypes
- Announcements of government funding programs for AM developments

5.4. Raising the profile of CAMiNA in articles, conferences and events.

## 6. Co-ordination & Resources

There is no financial contribution required for being a member of the CAMiNA although members are encouraged to participate on an in-kind basis leveraging wherever possible existing forums and opportunities. OCNI will provide base support to facilitate co-ordination of the group including logistics, communications, and other resources. Organizations may choose to offer additional in-kind supports as needed at their choosing. The Program Director, with oversight from the Executive Committee, may pursue funding opportunities to support CAMiNA activities.

## 7. Values

The CAMiNA will follow the OCNI corporate values:

- **RESPONSIBLE:** We are accountable, transparent, and genuine in all our communications and dealings with each other, our members, supporters and those associated with the industry.
- **COMMITMENT**: We are committed to the growth and development of the Canadian Nuclear sector, suppliers, members and each other.
- **INCLUSIVE:** We foster and encourage diverse perspectives, opportunities and challenges in an equal and equitable manner.
- **SERVICE:** We strive for excellence by maintaining and enhancing our own knowledge and skills, by encouraging the professional development of co-workers, and by fostering member growth.
- CHAMPION: We encourage good governance and social responsibility.

# 8. References

8.1. Advanced Manufacturing Roadmap for the Canadian Nuclear Industry, December 14, 2021.