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# **Radiabeam Industrial Accelerator Commissioning Cooperative Research and Development Agreement Final Report**

**CRADA Number: FRA-2016-0047**

**Fermilab Technical Contact: Charlie Cooper**

Summary Report  
30 September 2019

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In accordance with Requirements set forth in Article X of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

**CRADA number:** FRA-2016-0047

**CRADA Title:** Radiabeam Industrial Accelerator Commissioning

**Parties to the Agreement:** RadiaBeam, LLC and Fermi Research Alliance, LLC

**Abstract of CRADA work:**

Radiabeam is building an industrial accelerator funded by the Defense Nuclear Detection Office in the Department of Homeland Security. The accelerator is designed as a radiation source for systems intended to find Special Nuclear Materials or contraband in cargo containers. Fermilab staff will travel to Radiabeam to help in commissioning of the accelerator. This work would primarily be focused on optimization of beam dynamics. In doing this, Fermilab would gain valuable general information about industrial linac operation and commissioning. Fermilab will also gain specific information about this new accelerator in support of a planned larger collaboration with Radiabeam.

**Summary of Research Results:**

The laboratory supported the travel and time for two engineers from Fermilab's Technical Division with expertise in radio-frequency systems and accelerators to assist in Radiabeam's commissioning of their new accelerator. This accelerator detailed in the below referenced paper had some new design features specific for rail cargo inspection. Because of these new features, Radiabeam requested Fermilab's expertise in commissioning of the system. While Fermilab staff did not participate directly in the commissioning, they instead advised Radiabeam on commissioning procedures and the results which were appropriate for their accelerator. The accelerator was commissioned successfully without any unforeseen issues.

**Related Reports, Publications, and Presentations:**

Kutsaev, Sergey V.; Agustsson, Ronald; Arodzero, Anatoli; Boucher, Salime; Faillace, Luigi; Hartzell, Josiah; Ziskin, Vitaliy. "Electron Linac with Deep Energy Control for Adaptive Rail Cargo Inspection System." 2015.

**Subject Inventions listing:**

None

**Report Date:** 30 September 2019

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