

IFAST ACCELERATORS FOR SOCIETAL APPLICATIONS

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The Accelerators for Societal Applications work package of the IFAST H2020 project is studying the novel applications of particle accelerators in the medical, environmental, industrial and imaging areas. It is building on the work of two previous H2020 and FP7 projects, ARIES and EuCARD2. All three of these projects were coordinated by CERN.

EuCARD2 did a thorough analysis of the existing and potentially new applications of accelerators at that time and published the results in a book entitled “The Applications of Particle Accelerators in Europe” [1]. Subsequently, ARIES and now IFAST have identified the novel applications with the best potential for commercialisation, studied them in detail and initiated development and prototyping activities to promote their industrial use.

In particular, IFAST is undertaking the following tasks:

- Novel forms of radiotherapy: this is studying new forms of radiotherapy for cancer treatment that are currently being developed, like FLASH, mini-beams and ion beams, and investigating accelerator developments able to achieve the optimal requirements for these treatments
- Environmental applications of electron beams: this is considering how to push forward environmental applications of electrons beams, in particular for the treatment of (a) wastewater and sewage sludge, (b) marine diesel engine exhaust gases and (c) ship ballast water
- Accelerator imaging: this is exploring innovation in the use of particle beams for imaging, in particular in the security and medical areas. The applications being studied are X-ray cargo scanning

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and non-destructive testing, neutron sources for non-destructive testing, proton radiography, X-ray imaging of dense targets and compact Compton sources

- Accelerator production of radioisotopes for imaging and therapy: this is investigating radioisotopes that have a large potential for medical imaging and therapy but are not available in sufficient quantities for regular use due to limitations arising from current accelerator technology. It is studying how new technology could be used to make them more available and how this could be implemented in practice, in particular in or close to hospitals
- Barriers to accelerator adoption by industry: this is studying the barriers which are discouraging some companies from benefitting from accelerator technologies. These include financial concerns, legal barriers, security concerns and lack of specialized knowledge. It is using experience from companies that have successfully introduced their use to address these concerns.

This presentation will describe many of these applications, show what has been learnt from the work being done and discuss the steps being taken towards commercialisation.

REFERENCES

- [1] FAUS-GOLFE, Á. and EDGECOCK, R., Applications of Particle Accelerators in Europe, ISBN 978-83-7814-704-6 Jun 2017, 116 p.