

Executive Summary



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1. Title of the Project: Design, development and commercialization of radar-on-chip technology.
2. Date of Start of the Project: October 1, 2020
3. Aims and Objectives: Design and prototyping of radars-on-chip leading to commercialization with start-up company incubation and transfer-of-technology (ToT). The proposed milestones are:
 - i. *Years 1 and 2*: Design and fabrication of multiple chips incorporating indigenous radar-on-chip technology. Prototype development.
 - ii. *Year 3*: Field Trials of Product-prototype. Design-iterations
 - iii. *Years 4 and 5*: Technology transfer, Startup-Incubation, Commercialization.
4. Significant achievements (not more than 500 words to include List of patents, publications, prototype, deployment etc):

In the first year of the fellowship, a radar-on-chip (funded earlier by IMPRINT) was thoroughly characterized, and the shortcomings of the chip were identified. This led to the development of a revised radar-on-chip design which was sent for fabrication to a fab in Taiwan in July 2021. The chips are expected in December 2021. Following publications and patents were filed and published during this period.

- [1] I. Raja and **G. Banerjee**, "A 0.75–2.5 GHz All-Digital RF Transmitter with Integrated Class-E Power Amplifier for Spectrum Sharing Applications in 5G Radios," *IEEE Trans. VLSI Systems*, vol. 28, no. 10, pp. 2109-2121, Oct. 2020.
- [2] M. Lenka, A. Shrivastava and **G. Banerjee**, "A Wideband Frequency Translational Resistive Feedback Receiver Resilient to Large Harmonic Blockers," *Analog Int. Circ. And Sig. Proc.*, Springer, Volume 107, pp. 83-100, Apr. 2021.
- [3] D. Subrahmanyam, P. Panda, **G. Banerjee**, TV Prabhakar, "Breathing Assistance Apparatus", *US Patent Pending*, App. No. 17/220,077, 2021, Published.
- [4] D. Subrahmanyam, P. Panda, **G. Banerjee**, TV Prabhakar, "Breathing Assistance Apparatus", *Indian Patent Pending*, App. No. 202041014759, 2021.

5. Concluding remarks

We gratefully acknowledge the financial assistance provided by the INAE through the Kalam Fellowship, which has supported the awardee and many key aspects of the ongoing radar-on-chip development work at IISc. Our work was somewhat impacted by the lockdowns during the pandemic as we require physical presence in the labs. However, we have mostly recovered from the impact of the pandemic and are currently on track to meet the project deliverables.