C	Area	Compound Semiconductor Technology (SCL)
C.1	**Development of process technology for Germanium–via heterogeneous integration with silicon** It is required to develop a growth method of Ge on Si integration using Chemical Vapour Deposition (CVD) with the aim to achieve reasonable quality for electronic and photonic applications. Once the Ge/Si hetrostructure with the desired properties is obtained, it is required that their electrical and optical properties need to be studied by fabricating active devices. The proposed development work should cover materials study, growth/fabrication, and device characterization	
C.2	**Si-on-GaAs: Monolithic Hetrogenous Integration of Si-CMOS with GaAs Optoelectronic Devices using EoE technology** As electronic technology becomes faster and denser, electrical interconnects (wires) have begun to limit the performance of the systems that depends on them. In order to alleviate this problem, optical interconnects are being considered as an alternative. Some of the benefits of optical interconnects include higher speeds of operation with low drive requirements and minimal power dissipation, reduced size weight and cost, freedom from electromagnetic interference, crosstalk and ease of layout and routing. In order to implement optical interconnects, optoelectronic integrated circuits (OEICs) which integrate both electrical devices (transistors) with optical devices (optical detectors and emitters) must be created using electronic integrated circuits. However, due to intrinsic structure of silicon, this material is not capable of emitting light efficiently. Compound semiconductors such as GaAs on the other hand can be used to make LEDs and Lasers. Efforts are on without much success to develop technology that would support the monolithic integration of these two types of semiconductors. Therefore, it is proposed to develop a new technology which can combine silicon and GaAs substrates by wafer bonding or Epitaxy on Elec tonics (EoE).	
C.3	**Use of engineered substrates to realize high quality Gallium Nitride epitaxial FinFET devices for power electronics** Gallium Nitride (GaN), being a wide bandgap semiconductor, has gained unprecedented interest in recent times for its desired figures of merits in power and opto electronics and RF applications. The advent of 5G and miniaturization of power devices is expected to give a further impetus to the	

	proliferation of GaN based technology. This project proposes the use of engineered substrates to realize high quality GaN based FinFET devices.
C.4	**Wireless power transmission based on Solar Power Satellites** More than 70% of electrical energy requirements in India are met through fossil fuel based power plants. Due to the adverse environmental impact of fossil fuels based energy generation, requirements to generate sustainable renewable energy has become a dire need of this decade. Several research groups around the globe have reported different renewable energy generation and transmission schemes . The approach of using solar power satellites (SPS) to generate renewable energy is one such scheme, which will be required to develop or co-developed with the partner institute and SCL.