Defence Science and Technology Group (DST) has launched a collaborative research program with colleagues from industry and academia on a high-risk, high-payoff satellite communications (SATCOM) research venture that has the potential to significantly enhance military capability.

Known as Project CHORUS, which stands for Compact Hybrid Optical-RF User Segment, this is Defence’s first collaborative project to be launched through the SmartSat Cooperative Research Centre (CRC).

The project will see a cross-sector team exploring ways of integrating both laser-based optical and radio frequency (RF) communications technologies in a single SATCOM user terminal.

Professor Andy Koronios, chief executive and managing director of the SmartSat CRC, said, “The SmartSat CRC, in partnership with Defence, has established this project in order to develop world-leading Australian technologies that will improve the resilience of military satellite communications, and potentially provide leapfrog technology for commercial markets.”

During the first phase of the research, the team will assess the viability of different design options and create a virtual representation, or ‘digital twin’, of the CHORUS concept to support the development of a demonstration terminal later in the project.

Funding for Phase 1 represents an investment by the SmartSat CRC and project participants of about $1 million over 12 months.

“By combining optical and RF communications, satellite operators will have more options to provide high-availability, high-capacity and high-resilience satellite communications services without requiring additional access to scarce and expensive radio spectrum,” Professor Koronios said.

With total funding worth $245 million and involving more than 100 companies, start-ups and research organisations, the SmartSat CRC is the biggest space industry research and development collaboration in Australia's history. The research consortium formally opened for business in February.

The research effort brings together experts from DST, industry partners EOS Space Systems and EM Solutions, Lyrebird Antenna Research and Shoal Group, and academic partners the Australian National University and the University of South Australia.

Dr Gerald Bolding, senior research scientist - protected satellite communications within DST’s Cyber and Electronic Warfare Division, added, “We are seeking to provide satellite operators with the best of both worlds, combining the high data transfer rates and enhanced security promised by optical communications with the reliability of traditional RF communications.”

“The end result will be the development of innovative technology options for integrating hybrid optical-RF SATCOM terminals into military aircraft, land vehicles and ships.”

Defence will contribute $12 million in funding to the SmartSat CRC over seven years. As a core participant in the consortium, DST will support research projects that address Australia’s need for sovereign space capabilities or explore disruptive approaches to delivering space-enabled services for the Australian Defence Force.

Andrew Seedhouse, chief of DST’s Intelligence, Surveillance and Space Division, added, “Defence is constantly looking for opportunities to collaborate with the brightest minds within Australian companies and universities to achieve even better capability outcomes for the nation, and our involvement in the SmartSat CRC is a great example of this approach.”

This national R&D endeavour is anticipated to drive the development of advanced technologies in the fields of communications and connectivity, intelligent space systems and Earth observation.