



A BRIEF REPORT ON TECHNOLOGY TRANSFER



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Executive Overview & Industrial Scope

The National Remote Sensing Centre (NRSC) has been at the forefront of translating indigenous research and development into commercially viable industrial products. With the unveiling of the Indian Space Policy 2023, NRSC has been striving to build a developmental ecosystem for NGEs in collaboration with IN-SPACe. NRSC has been actively involved in the transfer of its technology developments to NGEs to foster domestic industrial capabilities under the Make in India initiative and to realise India's vision of Viksit Bharath 2047.

ACTIVE TECHNOLOGY TRANSFER PORTFOLIO MATRIX

Technology System	Domain/Category	Deployment Target	Key commercial Value
Portable Bathymetry Profiler System	Hydrography & Hydrology	ASVs, Light Boats, UAVs	Compact depth (100m) & water quality profiling; field validation of spaceborne sensor data.
Triband (S/X/Ka) Monopulse Antenna Feed	Next-Gen RF Communications	Mountable on a 7.5m Parabolic Dish	Ultra-high bandwidth Ka-Band downlink with monopulse auto-tracking error sensing.
Two/Tri-Axis ACSS Servo System	Mechatronics & Motion Control	PLC	High-precision closed-loop positioner drive; keyhole mitigation for overhead passes.

Strategic Objectives of NRSC Technology Transfer

Indigenous Supply Chain Development: Empowering domestic Indian industry to manufacture ground station equipment, antenna feeds, and hydrographic profilers, reducing import reliance for defense and scientific sectors.

Commercial Ground Station Expansion: Supporting Ground-Station-as-a-Service (GSaaS) providers and commercial satellite operators with standardized, field-proven monopulse feeds and antenna controllers.

Technology Assests Commercialized

TECHNOLOGY ASSET	RECIPIENT	OUTCOME STATUS	TRANSFER FEE
Portable Bathymetry Profiler System	M/s JalKruti Water Solutions Pvt. Ltd.	Transferred	₹450,430
Triband (S, X, Ka) Antenna dual circularly polarized Monopulse feed For LEO satellite auto-tracking and data reception	M/s Avantel	Transferred	₹12,809,241
Two/Tri-axis Antenna Control Servo System ACSS platform	M/s Avantel	Transferred	₹2,656,220
Triband (S, X, Ka) Antenna dual circularly polarized Monopulse feed For LEO satellite auto-tracking and data reception	M/s BEL	CTTC Approved	₹12,809,241

Detailed Assessment Report

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Portable Bathymetry Profiler System

Domain: Hydrology & Earth Observation | Category: Instrumentation

The Portable Bathymetry Profiler System is a compact, multi-parameter, immersion-type bathymetric profiling system developed by NRSC to measure water depth, surface Dissolved Oxygen (DO), Surface Temperature (ST), and geo-location in a synchronized manner. Designed using commercial off-the-shelf (COTS) components operating on echo-sounding principles, this system fulfills a critical requirement for in-situ validation of bathymetric estimations derived from spaceborne and airborne remote sensing sensors.

Key Capabilities & Features

Low-SWaP Architecture: Compact enclosure (11.8" x 9.4" x 4.7"), lightweight (< 4.5 kg), and power efficient (~5W typical).

Rugged Design: IP86 waterproof rating suitable for deployment on Autonomous Surface Vehicles (ASV) and UAV platforms.

Expandable Sensor Suite: Provision to integrate up to 4 additional water quality parameters (e.g., pH, Turbidity).

Data Compatibility: Stores raw data on internal SD memory and exports formatted .csv data directly readable by QGIS and GIS database tools.

Technology Transfer

The Technology Transfer Document handover ceremony to M/s Jalkruthi water solutions was held on 04th September 2025



2 Triband (S/X/Ka) Monopulse Feed

Domain: Advanced RF | Category: Next-Gen Multi-Band RF

The Triband (S, X, Ka) Antenna Feed is a highly complex, state-of-the-art RF feed system featuring dual circular polarisation and monopulse tracking capabilities across three distinct microwave bands. Designed to meet the demands of modern high-data-rate remote sensing satellites, this feed allows ground stations to handle legacy S/X-band links while unlocking ultra-high bandwidth payload downloads in the Ka-band using multimode monopulse error-sensing for millimeter-wave tracking precision.

Key Technical Capabilities & Features

Tri-Spectrum Operation: Unified feed geometry covering S-Band (TT&C), X-Band (Medium Rx), and Ka-Band (High-Rate Rx).

Monopulse Auto-Tracking: Integrated monopulse comparator network yielding precise elevation and azimuth tracking error vectors.

Co-Axial Phase Alignment: Engineered phase center stability across 2 GHz to 27 GHz to maintain dish gain efficiency.

Future-Proof Ground Segment: Ideal upgrade path for multi-satellite receiving terminals supporting next-gen EO constellations

Technology Transfer

The Technology Transfer Document handover ceremony for the Triband Antenna Feed to M/S Avantel Limited was held on 25 September 2025.



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Two/Tri-Axis Antenna Control Servo System (ACSS)

Domain: Mechatronics & Motion Control | Category: Ground Station Drive Controllers

The Two/Tri-Axis Antenna Control Servo System (ACSS) is an intelligent, high-precision motion-control hardware-and-software unit designed to drive ground-station tracking antennas. Engineered specifically for tracking Low Earth Orbit (LEO) satellites, the system mitigates the "overhead zenith keyhole problem" by utilising dynamic 3-axis kinematics or high-slew 2-axis control algorithms such as PID/Feedforward, ensuring unbroken data lock during high-elevation satellite overhead passes.

Key Technical Capabilities & Features

Closed-Loop Servo Architecture: Real-time trajectory generation using TLE/Ephemeris data integrated with RF monopulse feedback.

Zenith Pass Keyhole Solution: Tri-axis motion control (Azimuth / Elevation / Tilt) eliminates tracking velocity saturation.

High Pointing Precision: Dynamic pointing error 0.07° RMS/BRE under operational wind loading conditions.

Safety Interlocks: Hardware and software limit detection, auto-stow positioning, and health monitoring diagnostics.

Technology Transfer

The Technology Transfer Document handover ceremony for the Tri-axis Antenna Control Servo System ACSS to M/s. Avantel Limited was held on 11 September 2026.



Strategic Outlook

NRSC has successfully transferred technologies it developed, earning revenue exceeding ₹2 crores during 2025-2026. In the coming months, it will provide validation and verification support to NGEs such as M/S SATLEO, M/S SATSURE, and M/S Omnipresent through IN-SPACe. Through new Innovation programs, investing in the development of human resources to advance new technologies of commercial and societal value in the remote sensing data reception and applications domain.