Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?



MAINS MASTERY 2026 · GS PAPER III · QUESTION 15 · STUDENT EDITION

Mission Drishti and the OptoSAR Breakthrough

THE QUESTION, AS SET IN UPSC CSE MAINS 2026

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

Directive: Mention · Discuss · Why | 15 marks | 250 words

Science and Technology: Earth observation

1 **PYQ Deep Decode** — Mission, sensors, novelty, form
2 **PYQ Intelligence** — Space-tech PYQs and 2026 context
3 **Additional information** — Payload physics and applications
4 **Pitfalls and variations** — Six errors and changed demands
5 **The model answer** — Features, imaging, novelty, impact
6 **Other ways to write it** — Alternative answer outlines
7 **Quick recall** — Sixteen mission and sensor facts
8 **Write it yourself** — Seven checks and sources

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1 PYQ Deep Decode

Read the question the way the examiner set it: the three explicit demands, the hidden demand, the structure that follows from them, and how the answer should be presented, opened and closed.

1.1 The demand

The question concerns **Mission Drishti, the Indian private-sector Earth-observation satellite launched on 3 May 2026**. It asks three things. First, **"Mention"** requires concise identification of the mission's objectives, defining technological features and intended applications. Second, **"Discuss"** requires explanation of the imaging techniques employed, their working principles and distinctive capabilities. Third, **"Why"** requires establishing the precise basis of the claimed world first through comparison with previous satellite capabilities. The answer must distinguish **technological design from demonstrated operational performance**, since a successful launch does not by itself prove that an integrated imaging system subsequently functioned in orbit.

Words in the question	What they ask you to do	What goes wrong if you miss them
Mention salient features	Identify the mission's objectives, principal technological features and intended applications. Select what defines the mission, rather than listing every spacecraft component.	Writing a general history of Indian space technology without identifying the mission's distinctive characteristics.
Mission Drishti	Keep the answer centred on GalaxEye's Earth-observation satellite and its OptoSAR architecture.	Confusing Drishti with ISRO's Cartosat series or the NASA-ISRO NISAR satellite.
Discuss the imaging techniques	Explain the technologies employed, how their measurements are acquired and processed, their complementary capabilities and operational applications.	Merely expanding the abbreviations SAR and MSI without explaining how either sensor works.
satellite launched on 3rd May 2026	Identify the specific spacecraft, launch event and technological configuration, while separating the launch from subsequent commissioning.	Attributing the launch to the wrong vehicle, location, agency or date.
world's first satellite of its kind	Specify the narrow claimed novelty and distinguish it from earlier optical satellites, SAR satellites and existing methods of combining their data.	Claiming that Drishti invented radar imaging, optical imaging or multisensor remote sensing.
Why it is being considered	Establish the reasoning behind the claim, explain the technological advance and compare it with previous satellite capabilities.	Repeating "world's first" as a slogan without explaining what is actually new.

THE DEMAND IN ONE LINE

Identify Mission Drishti's defining features; explain multispectral optical imaging, Synthetic Aperture Radar and their fusion; then establish why their coordinated integration on one commercial satellite was claimed as a world first.

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1.2 The hidden demand

The phrase **"world's first satellite of its kind"** is the conceptual test. Optical imaging and radar imaging existed long before Mission Drishti. Optical and radar datasets from different satellites have also been combined for years. The answer must therefore locate the innovation more precisely than simply saying that Drishti can observe Earth in different weather conditions.

GalaxEye's proposed OptoSAR advance is **a high-resolution commercial architecture integrating multispectral optical imaging and X-band SAR for coordinated acquisition and real-time onboard fusion**. Such integration is not the first instance of radar-optical co-location or simultaneous observation: ESA's Envisat acquired and combined data from both sensors in 2002. The narrower, GalaxEye-claimed distinction concerns its proprietary onboard processing and fused-product design, whose in-orbit operation was not publicly validated.

The hidden demand is what such a system could contribute to **India's Earth-observation capability once demonstrated in orbit**. Monsoon cloud cover, agricultural monitoring, flood assessment, maritime surveillance and rapidly changing strategic situations create a need for dependable observations. Coordinated optical-radar imaging could reduce gaps in information and improve the interpretation of surface changes.

However, **capability intended is not necessarily capability proven**. On **7 July 2026**, GalaxEye reported loss of communication with Mission Drishti after an anomaly during the final stage of its Launch and Early Orbit Phase. Although important spacecraft systems had been validated, publicly available evidence did not establish successful operational OptoSAR imaging. A strong answer therefore distinguishes the **launched technological architecture** from a fully demonstrated imaging service.

The following distinctions help establish precisely what the satellite contributes, where its innovation lies and what remains to be demonstrated.

Technology or evidence	What it establishes	What the stronger answer adds
Multispectral optical imaging	Records reflected electromagnetic radiation across selected spectral bands.	Explains vegetation, water and land-cover discrimination, and the limitations of clouds and darkness.
Synthetic Aperture Radar	Uses transmitted microwave pulses and returned echoes to create radar images.	Explains active sensing, synthetic aperture formation and observation without sunlight.
Same-platform OptoSAR	Combines the two different sensors aboard one satellite for coordinated acquisition.	Identifies reduced temporal mismatch, easier data alignment and the potential value of fused information.
7 July 2026 mission update	Communication was lost following substantial early-orbit spacecraft validation.	Separates engineering progress from proof of operational fused imagery.

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WEAK

Mission Drishti is the world's first satellite because it uses cameras and radar to take clear pictures of the Earth at night and during cloudy weather.

STRONG

GalaxEye's world-first OptoSAR claim rests on combining multispectral optical imaging and X-band SAR on one commercial spacecraft for coordinated, same-pass observation and fused products. Optical sensing supplies spectral context while SAR supplies weather-resilient microwave observations. The architecture was successfully launched, although the July 2026 loss of contact prevented public verification of sustained operational fused imaging.

1.3 The structure

The question contains **three explicit parts in a fixed order**: mission features, imaging techniques and the basis of the world-first claim. The hidden demand becomes a **short fourth part** on implications for India's Earth-observation capability. The shares below apply to the body between the introduction and conclusion. They are a teaching guide, not a UPSC rule.

Introduction	1. Salient features about three-tenths	2. Imaging techniques about three-tenths	3. World-first claim about three-tenths	4. Indian capability about one-tenth	Conclusion

Part 1 **Salient features of Mission Drishti** about three-tenths

Mission objectives	High-resolution Earth observation combining optical clarity with radar's day-night and weather-resilient capabilities.
Principal technological features	GalaxEye; Falcon 9 launch on 3 May 2026; approximately 190 kg spacecraft; sun-synchronous low Earth orbit; seven-band MSI and X-band SAR.
Intended applications	Agriculture, disaster management, defence, border and maritime surveillance, infrastructure and environmental monitoring.

Part 2 **Imaging techniques used in the satellite** about three-tenths

Multispectral imaging	Passive detection of reflected solar radiation across selected spectral bands.
Synthetic Aperture Radar	Active microwave transmission, reflected echoes and coherent processing of observations acquired along the spacecraft's trajectory.
Distinctive capabilities	Optical spectral discrimination alongside radar observations through ordinary cloud cover and without sunlight.
Operational applications	Vegetation monitoring, surface-water mapping, vessel detection, infrastructure surveillance and change detection.

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Part 3 **Why the world-first claim is made** about three-tenths

Precise basis	High-resolution commercial multispectral and X-band radar sensors designed for coordinated acquisition and proposed real-time onboard fusion.
Technological novelty	Proposed onboard fusion of aligned optical and radar data; same-pass acquisition reduces temporal mismatch but was not itself a first.
Comparison	Optical-only and SAR-only satellites, Envisat's simultaneous optical-radar observations (2002), separate-satellite data fusion and NISAR's dual-frequency radar.
Qualification	World-first OptoSAR architecture claimed and launched; operational fused imagery not publicly established following the July anomaly.

Part 4 **What the capability means for Indian Earth observation** about one-tenth: hidden demand

Strategic value	Potential domestic capability in multimodal geospatial intelligence, particularly for cloud-prone areas and rapidly changing situations.
Technology maturation	Need for validated payload operation, spacecraft reliability and sustained data delivery before the proposed benefits are realised.

1.4 How to present it

The form follows the question. It combines **mission description, physical working principles and technological comparison**. Use **short headed points** for Part 1, a compact **optical-versus-SAR comparison** for Part 2, and a **two-sensor fusion flow** for Part 3. A brief comparison with NISAR or separate optical and radar satellite systems establishes the novelty without overclaiming. Part 4 needs only a concise statement of potential Indian benefits and the importance of successful validation.

Form	Fit here	Reason
Headed points, sensor comparison and fusion flow	**Best**	Answers the three demands in their prescribed order and makes the novelty immediately visible.
Three-part comparative table	Good	Clearly separates mission features, technology and uniqueness, but may become cumbersome in a 250-word answer.
Chronological history of Indian satellites	Weak	Consumes words without explaining the specific imaging techniques or the claimed innovation.
Only a generic Earth-observation flowchart	Weak	Fails to explain optical reflection, radar echoes or why coordinated acquisition matters.

1.5 The introduction and the conclusion

The introduction serves the whole question. Identify Mission Drishti as a private Indian Earth-observation mission designed to integrate multispectral optical imaging and radar on one spacecraft. Connect the mission, its technology and the claimed innovation in a single opening thought.

The conclusion settles the whole demand. Explain how coordinated optical-radar imaging could strengthen India's Earth observation, while preserving the distinction between a novel satellite architecture that reached orbit and an operational capability requiring further demonstration.

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2 PYQ Intelligence 2015 to 2026

The mission's technological and policy context in 2026, the recurring skill UPSC tests through space-technology questions, and the ideas that should be prepared next.

2.1 Why the subject was topical in 2026

Mission Drishti emerged where three developments met: **private participation in India's space economy, sophisticated multisensor Earth observation and increasing demand for dependable geospatial intelligence**. GalaxEye had pursued technology development and demonstrations before launching its first satellite. A commercial distribution agreement with NSIL provided a potential market route. The mission's subsequent loss of communication also brought spacecraft reliability and the distinction between launch and operational performance into focus. UPSC does not explain why it selects individual questions, so these events are **context, not cause**. All the events below predate the August 2026 examination.

When	What happened	Why it matters for this question
2021	**GalaxEye Space Solutions** was founded by entrepreneurs associated with IIT Madras. The Bengaluru-based company began developing integrated optical and radar Earth-observation technology.	Establishes the Indian private-sector origin of the mission.
2023	The **Indian Space Policy, 2023** provided for non-governmental entities to establish and operate remote-sensing satellite systems and distribute satellite data, subject to the applicable authorisation framework administered by IN-SPACe.	Explains how private companies can build and operate commercial Earth-observation systems.
30 December 2024	ISRO's **PSLV-C60/SpaDeX** mission launched **POEM-4**, carrying the GalaxEye-developed **GLX-SQ SAR Imaging Demonstration Payload**. ISRO described its purpose as demonstrating SAR-image generation, capture and processing in a space environment, including a proposed reduction of approximately 400 MB of raw data to less than 1.5 MB after processing and compression.	An important technological precursor to Mission Drishti. A SAR processing demonstration is distinct from a complete optical-radar satellite.
30 July 2025	ISRO launched **NISAR**, the NASA-ISRO Synthetic Aperture Radar satellite, aboard **GSLV-F16** from Sriharikota. NISAR combines NASA's L-band radar and ISRO's S-band radar on one spacecraft.	Provides a critical comparison: dual-frequency radar is different from Drishti's optical-plus-radar architecture.
12 February 2026	**NewSpace India Limited (NSIL)** announced its first commercial agreement from its new GIFT City office, signed with **GalaxEye**, for reselling the company's satellite data and value-added solutions. The proposed OptoSAR products were described as combining coordinated optical and radar observations.	Connects private satellite technology with a commercial route for geospatial products, while not proving subsequent satellite operations.
3 May 2026, 12:30 PM IST	**Mission Drishti was launched** aboard a **SpaceX Falcon 9** from **Space Launch Complex 4E, Vandenberg Space Force Base, California**. It flew on the CAS500-2 rideshare mission. The rocket carried 45 payloads. GalaxEye described Drishti as an approximately **190 kg** satellite and India's largest privately built Earth-observation spacecraft.	The launch explicitly referenced by the question. The launch vehicle, location, mass and date are distinguishable from ISRO missions.

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When	What happened	Why it matters for this question
3 May 2026, 3:16 PM IST	The **Prime Minister's Office** issued a PIB release congratulating GalaxEye on the successful launch of Mission Drishti. It described the spacecraft as the **world's first OptoSAR satellite** and the largest privately built satellite in India.	Primary government confirmation of the description used in the examination question.
3 May 2026, 8:15 PM IST	A second PIB release, from the **Ministry of Home Affairs**, described Drishti as the world's first OptoSAR satellite combining **optical cameras and all-weather radar**.	Identifies the technologies behind the claimed world first, rather than merely repeating the label.
7 July 2026	**GalaxEye reported losing communication with Drishti** following an anomaly during the final stage of its Launch and Early Orbit Phase. The company said communication, deployment, attitude control, onboard computing and mission-control operations had substantially been validated. It indicated a **preliminary likely radiation-related cause associated with a geomagnetic solar storm**, but this was not a conclusively established finding. Recovery was considered unlikely.	The essential qualification: successful launch and partial spacecraft commissioning do not establish successful operational OptoSAR imaging.
24 July 2026	**ISRO released NISAR S-band SAR data products** through its Bhoonidhi Earth-observation data portal, confirming ongoing radar science operations, data processing and dissemination.	Provides a contrast between a functioning radar mission delivering data products and Drishti's proposed integrated optical-radar service.

Verification basis: GalaxEye's Mission Drishti page and technical specifications; ISRO's PSLV-C60/POEM-4 records and NISAR data release; NSIL's announcement of 12 February 2026; Exolaunch's CAS500-2 mission record; PIB releases of 3 May 2026; and GalaxEye's 7 July statement reported by The Times of India. Dates refer to the launch or official publication concerned, not to later news summaries.

2.2 The skill UPSC keeps testing

UPSC has repeatedly asked candidates to explain **what a space technology does, how it works, how it differs from earlier systems and what practical benefits it offers**. The progression runs from navigation satellites (2015), space achievements and socioeconomic applications (2016), mission challenges (2017), space-station objectives (2019), telescope technology (2022) and spacecraft subsystems (2023) to a specific private Earth-observation satellite in 2026. The common skill is **technical explanation joined to comparison and application**.

Year	The question as UPSC set it	What it asked of you	What changed in 2026
2015 GS III, Q11	What do you understand by 'Standard Positioning Systems' and 'Precision Positioning Systems' in the GPS era ? Discuss the advantages India perceives from its ambitious IRNSS programme employing just seven satellites.	Differentiate technological capabilities and relate them to an Indian satellite programme.	From navigation systems to the complementarity of two Earth-imaging technologies.
2016 GS III, Q12	Discuss India's achievements in the field of Space Science and Technology. How the application of this technology has helped India in its socio-economic development?	Connect space-technology achievements to their practical socioeconomic applications.	One private satellite and its intended applications in agriculture, disasters, infrastructure and security.

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Year	The question as UPSC set it	What it asked of you	What changed in 2026
2017 GS III, Q7	India has achieved remarkable successes in unmanned space missions including the Chandrayaan and Mars Orbitter Mission, but has not ventured into manned space missions. What are the main obstacles to launching a manned space mission, both in terms of technology and logistics ? Examine critically.	Identify technological and logistical barriers separating ambition from operational capability.	Satellite integration, radiation resilience and successful orbital commissioning become relevant.
2019 GS III, Q6	What is India's plan to have its own space station and how will it benefit our space programme?	Describe the proposed mission and explain expected benefits.	Distinguish the potential value of a novel imaging architecture from demonstrated results.
2022 GS III, Q15	Launched on 25th December, 2021, James Webb Space Telescope has been much in the news since then. What are its unique features which make it superior to its predecessor Space Telescopes ? What are the key goals of this mission ? What potential benefits does it hold for the human race ?	Explain distinctive instrument features, mission goals and advantages over earlier systems.	The same method now applies to OptoSAR, its imaging techniques and comparison with conventional satellites.
2023 GS III, Q16	What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the 'Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota.	Identify mission novelty, describe spacecraft subsystems and explain supporting launch infrastructure.	Explain two complementary imaging payloads, their integration and the claimed first-of-its-kind capability.

Also related, verbatim: 2026 GS III, Q16: What is agentic Artificial Intelligence (AI)? Explain its working. Describe its applications with suitable examples. Discuss the advantages, risks and challenges associated with agentic AI systems.

CARRY THIS METHOD TO ANY "FIRST-OF-ITS-KIND TECHNOLOGY" QUESTION

1. **Identify** the exact mission, its developer, objective and verified launch event.
2. **Explain** the underlying scientific principle of each technology named in the question.
3. **Compare** the technologies' strengths, limitations and complementary applications.
4. **Isolate** the precise innovation, distinguishing what is new from what already existed.
5. **Verify** whether the claimed capability has been demonstrated or remains a design objective.
6. **End with** the national or societal capability that successful implementation would add.

2.3 What to prepare next

IMAGING SCIENCE AND CONCEPTS

Active versus passive sensing	Optical MSI measures reflected sunlight; SAR transmits microwaves and records returned echoes.
Spectral versus spatial resolution	Number and width of bands describe spectral capability; spatial resolution concerns distinguishable ground detail.
Radar wavelengths	X-band, S-band and L-band differ in wavelength and interactions with surface materials.

MISSIONS, POLICY AND APPLICATIONS

Sentinel-1 and Sentinel-2	European radar and multispectral optical missions respectively, used as benchmarks for complementary satellite observations.
NISAR	NASA-ISRO L-band and S-band SAR mission, launched on 30 July 2025.
Indian Space Policy, 2023	Role of private satellite operators and IN-SPACe's authorisation framework.

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Radar processing	Backscatter, Doppler history, synthetic aperture, speckle, layover and radar shadow.
Sensor fusion	Time alignment, geometric co-registration, calibration and combination of complementary observations.
Operational trade-offs	Swath, revisit, resolution, cloud cover, spacecraft power and data-processing requirements.

NSIL	Commercial distribution of satellite data and value-added geospatial services.
Earth-observation applications	Flood mapping, crop monitoring, coastal surveillance and infrastructure change detection.
Spacecraft reliability	Launch and Early Orbit Phase, attitude control, radiation effects and payload commissioning.

3 Additional information

Everything needed to answer this question well. Tier 1 contains the mission facts, the workings of its imaging techniques and the basis of the world-first claim. Tier 2 places Drishti within the wider science, operational and policy context of Earth observation.

TIER 1 · ESSENTIAL: MISSION FEATURES, IMAGING TECHNIQUES AND THE CLAIMED INNOVATION

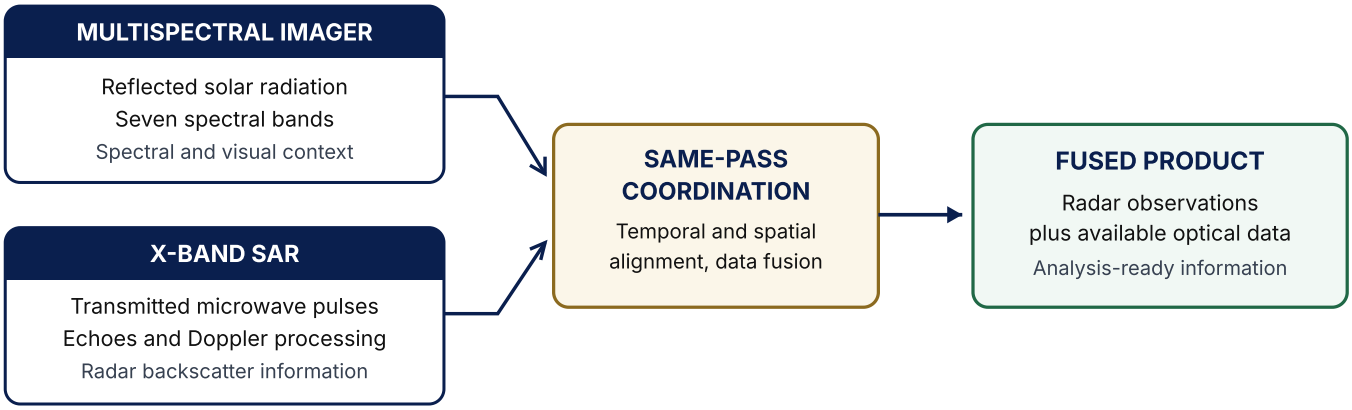
Mission Drishti: the facts that establish its identity

Feature	Verified mission details	What it establishes
Developer	**GalaxEye Space Solutions**, a Bengaluru-based Indian private company founded in 2021 by entrepreneurs associated with IIT Madras.	Indian private-sector satellite engineering, distinct from ISRO's own satellite missions.
Launch	**3 May 2026, 12:30 PM IST**; SpaceX Falcon 9; Space Launch Complex 4E, Vandenberg Space Force Base, California; **CAS500-2 rideshare mission**.	The launch was provided by SpaceX, not conducted from Sriharikota.
Mass	Approximately **190 kg**, described at launch as India's largest privately built Earth-observation satellite.	A milestone in the scale of Indian private satellite development.
Orbit	Intended sun-synchronous low Earth orbit at approximately **500 ± 10 km** altitude.	Repeat observation from a near-polar orbit with broadly consistent illumination geometry.
Core payload	**OptoSAR**, integrating X-band Synthetic Aperture Radar and seven-band multispectral imaging on the same spacecraft.	The mission's defining technological configuration.
SAR specifications	X-band, **VV polarisation**; stripmap and spotlight imaging modes; advertised resolution up to **0.9 m in spotlight mode**; listed radar swath up to **30 km**.	High-resolution active microwave imaging under a range of lighting and weather conditions.
Optical specifications	**Seven bands**, including coastal blue, red edge and near-infrared; listed native MSI ground sampling distance of **3.6 m at nadir**; listed MSI swath of **10 km**.	Spectral information useful for identifying and interpreting ground surfaces.
Fused product	GalaxEye advertises **1.8 m fused-data resolution**. Its separate mission page describes a spatial-resolution range of **1.2 to 3.6 m** across configurations.	Distinguish individual sensor specifications from advertised processed or fused products.

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Feature	Verified mission details	What it establishes
Revisit	Advertised **four-day revisit frequency**.	A mission-design specification, not proof that Drishti delivered a continuing four-day imaging service.
Applications	Defence and border surveillance, agriculture, disaster management, maritime monitoring, infrastructure and environmental intelligence.	Potential civilian and strategic uses of complementary optical-radar data.
Mission outcome	Successful launch and substantial early-orbit spacecraft validation, followed by **reported loss of communication on 7 July 2026**.	The distinction between an innovative satellite architecture reaching orbit and successful operational imaging.

How the OptoSAR imaging system works



A teaching diagram of the proposed OptoSAR imaging chain, based on GalaxEye's published payload specifications, NSIL's description of the fusion concept and established SAR principles. It is not an official diagram or evidence that the complete imaging chain was successfully demonstrated in orbit.

The imaging techniques: principles, capabilities and applications

Technique	How it works	What it adds and where it is used
TECHNIQUE 1: MULTISPECTRAL OPTICAL IMAGING (MSI)		
Passive observation	A multispectral imager detects **sunlight reflected from the Earth's surface** in selected wavelength bands. Materials differ in their spectral reflectance, permitting discrimination between vegetation, soil, water and built surfaces.	Visually interpretable surface information, land-cover classification, agriculture and environmental assessment. Reflective optical imaging requires suitable illumination and is obstructed by opaque clouds.
Seven spectral bands	GalaxEye lists **seven bands**, including coastal blue, red edge and near-infrared capabilities. Visible bands support colour interpretation; the red-edge and near-infrared portions are particularly relevant for vegetation studies.	Crop condition, vegetation classification, land cover, surface-water assessment and agricultural monitoring.
Panchromatic imaging	A broad spectral channel records brightness information over a relatively wide wavelength interval rather than separating light into numerous narrow bands.	Useful for surface detail and image interpretation. Panchromatic imaging is not equivalent to thermal infrared observation.

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Technique	How it works	What it adds and where it is used
TECHNIQUE 2: SYNTHETIC APERTURE RADAR (SAR)		
Active microwave sensing	SAR **transmits microwave pulses** towards the Earth's surface and measures returned echoes. Echo time provides range information, while signal strength and phase are influenced by surface properties and observation geometry.	Day-night observation through most ordinary cloud cover, suitable for flood mapping, ship detection, infrastructure monitoring and surface change analysis.
Synthetic aperture formation	As the satellite travels along its orbit, it receives successive echoes from a ground target. **Coherent processing of the phase and Doppler history** synthesises a much longer effective antenna, enabling fine along-track resolution.	High spatial detail without requiring an impractically large physical radar antenna.
X-band, VV polarisation	Drishti's SAR operates in the **X-band** and is specified with vertical transmission and vertical reception, denoted VV. The shorter wavelength is responsive to relatively fine surface structures and roughness.	Selected infrastructure features, vessels, surface structures and change detection. X-band observations are not immune to precipitation effects, radar shadow or geometric distortions.
Stripmap and spotlight	**Stripmap** acquires imagery along an extended ground strip. **Spotlight** concentrates observations on a smaller target area, enabling finer resolution through a longer synthetic aperture.	A trade-off between geographical coverage and detailed observation. GalaxEye advertises resolution up to 0.9 m in spotlight mode.
TECHNIQUE 3: COORDINATED OPTOSAR FUSION		
Common spacecraft	MSI and SAR sensors are integrated on the same satellite and designed for **coordinated observations of the same target during one orbital pass**.	Reduces the temporal difference that may occur when observations come from separate satellites.
Co-registration	Optical pixels and radar measurements must be aligned to the same geographical coordinates despite differences in imaging geometry, spatial resolution and measured physical properties.	Enables complementary radar and spectral information to be interpreted together.
OptoSAR fusion	The proposed processing architecture combines the two data streams into a fused product. GalaxEye has advertised **1.8 m fused-data resolution** and coordinated, analysis-ready imagery.	Potentially improved target interpretation, change detection and consistent geospatial analysis. Operational performance still requires calibration and validation.
Scientific limitation	When dense cloud or darkness prevents an optical observation, radar continues to provide a different kind of measurement. **Fusion does not transform radar echoes into a genuine missing optical photograph.**	Prevents exaggerating the claimed all-weather and day-night imaging capability.

Why it is considered the world's first of its kind

Previous satellite capability	What already existed	Drishti's claimed distinction
Optical Earth-observation satellites	Missions such as **Sentinel-2** provide multispectral measurements useful for vegetation, land cover, water and environmental monitoring.	Drishti integrates an active radar sensor with multispectral optical imaging on the same satellite.
SAR Earth-observation satellites	Missions such as **Sentinel-1** obtain radar imagery through clouds and in darkness.	Drishti adds optical spectral measurements and a proposed coordinated fusion architecture.

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Previous satellite capability	What already existed	Drishti's claimed distinction
Data fusion from separate satellites	Analysts have long combined separately acquired optical and radar datasets, but observations may differ in timing, ground coverage and viewing geometry.	**Coordinated same-pass acquisition** is intended to reduce such mismatches at the source.
NISAR, launched 2025	NASA's L-band and ISRO's S-band radars provide complementary microwave measurements on one spacecraft.	**Two radar frequencies are not optical-plus-radar imaging.** Drishti combines MSI and X-band SAR.
Mission Drishti, launched 2026	An approximately 190 kg commercial spacecraft integrating multispectral optical imaging and X-band SAR, with a proposed coordinated acquisition and fusion system.	GalaxEye and PIB describe the architecture as a **world-first OptoSAR satellite**. Its intended fused imaging service was not publicly proven before the subsequent communication loss.

The precise world-first claim. GalaxEye claims **a high-resolution commercial OptoSAR architecture combining multispectral optical and X-band SAR observations with proposed real-time onboard fusion**. ESA's Envisat had already acquired simultaneous optical and radar data in 2002. The claimed advance therefore concerns a particular integrated processing architecture, not the first single-satellite or same-pass use of both sensors.

The operational qualification. Successful orbital deployment is not the same as payload commissioning. The July 2026 anomaly prevented publicly verified delivery of the intended fused OptoSAR service. The claim should therefore be described as an architectural and engineering first, not an established record of sustained imaging performance.

What coordinated optical-radar imaging could change

Application	What the individual sensors contribute	What fusion could improve
Agriculture	MSI records vegetation reflectance and related spectral characteristics. SAR responds to surface moisture, roughness and vegetation structure.	More dependable crop monitoring during cloudy conditions, combining spectral and radar information.
Floods and disasters	SAR can delineate inundated areas under cloud cover; available optical data assist interpretation of land cover, settlements and affected infrastructure.	Faster and more informative mapping of rapidly changing disaster conditions.
Maritime surveillance	Radar can identify vessels through contrast with the surrounding sea; optical imagery provides additional visual context when conditions allow.	Better interpretation of vessels, coastal activity and selected anomalies.
Defence and borders	SAR supports observation without daylight and through cloud cover. Optical measurements help identify surface features and changes under suitable conditions.	Potentially more consistent monitoring of strategically significant locations.
Infrastructure	Optical images show visible surface features; radar provides complementary structural and surface information.	Improved interpretation of construction, land-use changes and selected infrastructure developments.
Environment	MSI supports vegetation and water monitoring; SAR contributes information about surface water, roughness and landscape change.	More resilient observations of wetlands, forests, coasts and other cloud-prone regions.

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These are intended or technically plausible applications, based on GalaxEye's mission description and established remote-sensing principles. They are not claims that Mission Drishti delivered these operational services after launch.

TIER 2 · EXTENDED UNDERSTANDING: THE WHOLE TOPIC AROUND IT

The science behind complementary observations

1. **Different measurements:** optical sensors measure reflected electromagnetic radiation; radar systems measure microwave backscatter and related phase information. Their outputs are physically different.
2. **Atmospheric effects:** optical imaging is obstructed by opaque clouds. Radar microwaves penetrate most ordinary cloud conditions, though rainfall and atmospheric effects can influence observations.
3. **Spatial resolution:** finer resolution reveals smaller ground details; it does not automatically ensure better classification or reliable interpretation.
4. **Spectral resolution:** selected wavelength bands help distinguish materials through their reflectance signatures. Calibration and appropriate band selection are essential.
5. **Radar image formation:** SAR combines echoes collected along the satellite's flight path. Speckle, layover, foreshortening and radar shadow can complicate interpretation.
6. **Fusion quality:** accurate co-registration, comparable observation geometry, calibration and validation determine how useful the combined product becomes.

What determines operational imaging performance

1. **Orbit:** sun-synchronous orbits provide repeat observations but not uninterrupted monitoring of every geographical location.
2. **Revisit:** the interval between imaging opportunities depends on orbital geometry, pointing and tasking.
3. **Swath:** the ground width imaged in one acquisition affects coverage and revisit opportunities.
4. **Power:** active radar transmission requires energy and imposes spacecraft thermal and power-management demands.
5. **Pointing:** stable attitude control is essential for precise optical and radar observations.
6. **Communications:** large imaging datasets require reliable downlink and ground-segment processing.
7. **Commissioning:** successful launch must be followed by subsystem verification, sensor activation, calibration and product validation.

Mission Drishti and NISAR: the essential comparison

Dimension	Mission Drishti	NISAR
Developer	GalaxEye, an Indian private company.	NASA and ISRO, a joint international mission.
Launch date	3 May 2026.	30 July 2025.
Launch vehicle	SpaceX Falcon 9.	ISRO GSLV-F16.
Launch site	Vandenberg, California, United States.	Sriharikota, Andhra Pradesh, India.
Instruments	Multispectral optical imager and X-band SAR.	L-band SAR and S-band SAR.
Distinctive design	Proposed coordinated optical-radar observation and OptoSAR fusion.	Dual-frequency SAR with a 12-metre reflector and SweepSAR acquisition technology.
Main purpose	Commercial and strategic high-resolution multisensor Earth observation.	Scientific monitoring of Earth's surfaces, ecosystems, ice, deformation and environmental change.
Status before August 2026	Launch and partial commissioning completed; communication subsequently lost.	Science operations and released calibrated SAR data products.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

From space technology to a commercial Earth-observation ecosystem

The **Indian Space Policy, 2023** provides a framework under which private entities can develop, operate and commercialise space systems, subject to applicable authorisation and regulatory requirements. **IN-SPACe** is responsible for promoting, authorising and supervising non-governmental space activities. **ISRO** remains central to national space research and technological development, while **NSIL** supports commercialisation.

The **NSIL-GalaxEye agreement of 12 February 2026** illustrates how private satellite engineering can connect with markets for imagery and value-added geospatial solutions. OptoSAR data, if successfully validated and supplied, could complement established public and commercial satellite datasets. The agreement establishes a commercial pathway, not evidence that operational fused imagery was later delivered.

The July 2026 setback: what was achieved and what was not

On **7 July 2026**, GalaxEye disclosed that contact with its maiden Earth-observation satellite had been lost following an anomaly during the final stage of the **Launch and Early Orbit Phase (LEOP)**. The company reported that the mission had already completed a substantial portion of LEOP, including establishing communication with ground stations, testing important spacecraft systems, carrying out deployment and attitude-control operations, and demonstrating its mission-control capability.

GalaxEye identified **radiation effects associated with a geomagnetic solar storm** as a preliminary likely explanation. This must not be presented as a conclusive engineering finding. Communication became intermittent and was subsequently lost, and recovery was considered unlikely. The company indicated that experience from Drishti would inform its next-generation satellite programme.

Accordingly, **three achievements must be distinguished**: constructing and launching an integrated optical-radar satellite, validating important spacecraft subsystems in orbit, and demonstrating a fully operational fused-imaging payload. Available public reporting supports the first two to differing extents, but does not establish the third.

The stages between satellite launch and a useful imaging service

Stage	What has to be demonstrated	Evidence required
1. Technology design	Integration of MSI, SAR, computing, power, pointing and communications.	Ground integration, testing and qualification.
2. Launch and deployment	Placement of the spacecraft in the intended orbit and successful separation.	Launch records and initial telemetry.
3. Spacecraft commissioning	Power, communications, onboard computing, attitude control and other bus systems.	Engineering telemetry and subsystem test results.
4. Payload commissioning	Activation and calibration of the optical and radar instruments.	Verified imagery from both instruments.
5. Sensor fusion validation	Spatial alignment, coordinated acquisition and reliable fused products.	Published sample products and quality assessments.
6. Operational service	Repeat imaging and dependable delivery of usable data.	Sustained availability and validated data products.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

Two debates worth knowing

Does a world-first launch establish a world-first operational capability?

One view recognises the achievement of integrating a novel instrument architecture and placing it in orbit. GalaxEye and the Government described Mission Drishti as the world's first OptoSAR satellite on that basis. The other view emphasises that the defining value of an imaging spacecraft must ultimately be established through actual sensor operation, calibration and useful data products. Drishti's July 2026 communication loss makes that distinction material. The balanced reading is that **a claimed architectural first can coexist with the absence of proven operational fused imagery**. Engineering novelty and sustained service maturity are different measures of achievement.

One integrated multisensor satellite or several specialised satellites?

Placing MSI and SAR on one spacecraft can improve coordination, reduce acquisition-time mismatch and enable integrated products. However, combining instruments increases engineering complexity, power demands and dependence on a single spacecraft. Separate optical and radar satellites allow specialisation and potentially more resilient constellations, but their observations require additional coordination and co-registration. The balanced approach is to **choose the architecture according to the observation need**, while ensuring reliability, adequate redundancy, calibration and access to complementary datasets.

4 Pitfalls and variations

The six mistakes that weaken this answer, the technically incorrect claims never to make, and how the structure changes when a related question is framed differently.

4.1 Six pitfalls, each with its correction

Mission facts without the imaging science

~~GalaxEye launched a 190 kg satellite to monitor farms, borders and disasters.~~

Identify the mission briefly, then explain passive multispectral imaging, active SAR and how their complementary data are combined.

Treating both sensors as ordinary cameras

~~Optical cameras and radar cameras photograph the Earth's surface in different ways.~~

MSI measures reflected electromagnetic radiation; SAR transmits microwave pulses and processes returned echoes. These are different physical measurements.

Overstating all-weather imaging

~~Drishti's multispectral camera takes colour photographs at night and through thick clouds.~~

The SAR sensor can operate without sunlight and through most ordinary cloud conditions. Missing optical observations are not automatically recovered.

Making the world-first claim too broad

~~Mission Drishti was the first satellite ever to use optical and radar remote sensing.~~

Specify the claimed OptoSAR novelty: coordinated acquisition and integration of MSI and SAR aboard one commercial satellite. The underlying technologies were already established.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

Confusing Drishti with NISAR

~~Drishti was developed jointly by NASA and ISRO and uses L-band and S-band radar.~~

Drishti was developed by GalaxEye and launched by SpaceX in May 2026; NISAR is the NASA-ISRO dual-frequency radar mission launched in July 2025.

Confusing launch success with sustained imaging

~~Drishti has been continuously delivering fused OptoSAR imagery since its May 2026 launch.~~

State the successful launch and innovative design, but distinguish them from operational payload validation. GalaxEye reported loss of communication in July 2026.

4.2 Never write these

- "Mission Drishti was launched by ISRO on 3 May 2026."
  GalaxEye developed the spacecraft, and SpaceX launched it from California.
- "Mission Drishti and NISAR are the same satellite."
  NISAR is a separate NASA-ISRO dual-frequency radar mission launched on 30 July 2025.
- "Drishti invented Synthetic Aperture Radar."
  SAR existed decades before Mission Drishti. Its novelty concerns the particular OptoSAR integration claim.
- "Drishti is the first satellite ever to take optical images of the Earth."
  Optical Earth-observation satellites existed long before 2026.
- "The multispectral optical sensor can see through dense clouds at night."
  Passive reflected-light imaging is limited by opaque clouds and the absence of sufficient illumination.
- "SAR can see through every material in every weather condition."
  Radar imaging depends on wavelength, target properties, geometry and atmospheric conditions. Heavy precipitation can affect X-band observations.
- "SAR produces ordinary natural-colour photographs."
  SAR produces microwave-derived images whose display colours are interpretations of radar information.
- "Drishti's SAR, optical imager and fused product all have 0.9 m resolution."
  GalaxEye specifies up to 0.9 m for SAR spotlight mode, 3.6 m native MSI ground sampling distance and 1.8 m fused-data resolution.
- "OptoSAR fusion can create the missing genuine optical image even when the camera cannot observe the surface."
  Fusion combines available information; it cannot recreate an actual reflected-light measurement that was never acquired.
- "A four-day revisit means continuous imaging of every location on Earth."
  Revisit describes opportunities for repeat observations and depends on orbital geometry, tasking and operational conditions.
- "Drishti successfully delivered commercial fused imagery after May 2026."
  Successful launch was reported, but operational fused imagery was not publicly verified before the July communication loss.
- "A geomagnetic storm was conclusively proved to have destroyed Drishti."
  GalaxEye described radiation effects associated with a geomagnetic solar storm as a preliminary likely cause, not a final established finding.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

4.3 If the question changes

If it asks	The structure becomes	What must change
Differentiate optical remote sensing and SAR	Passive versus active sensing; electromagnetic bands; working principles; imaging limitations; strengths and applications.	Reduce launch details; put the physical principles and comparative table at the centre.
Critically examine Mission Drishti's significance	Mission objectives; technological novelty; expected benefits; engineering limitations; July 2026 anomaly; implications.	Give more space to operational evidence, reliability, commercial viability and a balanced judgment.
Compare Drishti and NISAR	Developers; launch dates and vehicles; instruments; working principles; applications; orbit and operational status.	Make optical-plus-radar versus dual-frequency radar the central distinction. Neither is universally superior.
Explain sensor fusion in Earth observation	Need for complementary data; acquisition; calibration; co-registration; fusion processing; interpretation and validation.	Replace most mission facts with a technical flow and relevant applications.
Role of private companies in India's space sector	Indian Space Policy, 2023; IN-SPACe; NSIL; private innovation; commercial markets; regulation and reliability challenges.	Use GalaxEye as one case within a wider policy and economic analysis.
Earth observation for disaster management	Hazard mapping; early warning support; weather-resilient imaging; damage assessment; ground validation and last-mile use.	Place disaster applications at the centre and treat MSI and SAR as supporting technological tools.
Challenges of developing commercial imaging satellites	Satellite design; payload integration; radiation resilience; launch and commissioning; calibration; ground segment; market viability.	Use the Drishti anomaly as a case in spacecraft reliability, without asserting an unproven technical root cause.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

5

The model answer

One model answer, written to the UPSC Gurus house range of 250 to 253 words (**252 words**, counting every whitespace-separated token in the answer sheet, including section numerals, headings, point labels and flow-box text; UPSC's printed limit is 250 words). The form follows the question: salient features first, the working of MSI and SAR second, the precise world-first claim third, and a short final part on India's Earth-observation capability. The introduction covers the entire question; the conclusion identifies the technological significance while distinguishing the proposed capability from operational validation.

Model answer ## Headed points, sensor comparison and a fusion flow **252 words**

Mission Drishti, developed by GalaxEye and launched aboard SpaceX's Falcon 9 on 3 May 2026, aimed to combine optical and radar Earth observation.

1. Salient features

- **Platform:** An approximately 190-kg private Indian satellite targeting a 500-km sun-synchronous low Earth orbit.
- **Payload:** Integrated OptoSAR, pairing seven-band multispectral imaging (MSI) with X-band Synthetic Aperture Radar (SAR); advertised fused resolution of 1.8 m.
- **Uses:** Crop assessment, flood mapping, maritime and border surveillance, infrastructure monitoring and environmental intelligence.

2. Imaging techniques

- **Optical MSI:** A passive instrument measures sunlight reflected in different spectral bands, distinguishing vegetation, soil and water. Clouds and darkness obstruct reflected-light imaging.
- **SAR:** An active sensor transmits microwave pulses; echo delay, strength and phase are processed across successive orbital positions to synthesise a long antenna. This enables detailed, day-night imaging through ordinary cloud cover.
- **Modes:** SAR spotlight prioritises detail; stripmap covers longer ground strips. The advertised spotlight resolution reaches 0.9 m.

3. Why a world first



GalaxEye claims a commercial first in high-resolution, onboard OptoSAR fusion. ESA's Envisat (2002) already combined simultaneous radar and optical imagery; same-pass imaging was not unprecedented. NISAR combines two radar frequencies, not optical and radar sensors.

4. India's Earth-observation gain

Fusion could improve monsoon-season monitoring and geospatial decisions. However, GalaxEye reported lost contact on 7 July 2026, before operational fused imagery was publicly verified.

Drishti demonstrated an Indian integration ambition, while future missions must validate reliable optical-radar imaging in orbit before its promised benefits become reality.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

DEMAND
Three explicit asks: Mission Drishti's salient features; imaging techniques used in the satellite launched on 3 May 2026; and the precise technological basis of the claimed world first

HIDDEN DEMAND
What coordinated optical-radar fusion could add to India's Earth-observation capability once demonstrated and validated in orbit

STRUCTURE
About three-tenths each on salient features, imaging techniques and the world-first claim, followed by a short final part on India's Earth-observation capability

BALANCE
Introduction 23 words, conclusion 22 words; 252 words in all

Why it works: The introduction identifies the mission, its developer, launch and integrated imaging objective. Part 1 compresses the defining spacecraft features, numerical specifications and applications. Part 2 explains the physical distinction between passive optical sensing and active SAR, including the synthetic aperture principle, imaging modes and operational limitations. Part 3 makes the claimed innovation visible through a four-stage fusion flow and carefully distinguishes GalaxEye's commercial OptoSAR claim from earlier multisensor satellite heritage, including ESA's Envisat, and from NISAR's dual-frequency radar. Part 4 answers the hidden demand by identifying the potential value for India's Earth observation while acknowledging the July 2026 communication loss. The conclusion places the technological ambition alongside the need for successful operational validation.

6 Other ways to write it

The model answer above remains the answer. These outlines show how different, equally valid presentations can satisfy the same demands without changing their order or exaggerating the world-first claim.

Approach	How it is built	When it works
Three-part comparison table	Introduction; a compact mission-features table; optical versus SAR working principles; an earlier-capability versus OptoSAR comparison; short Indian implication and conclusion.	When you want to make technological distinctions explicit and can keep the table readable within 250 words.
Sensor-to-product flow	Mission identity and objectives; two parallel branches for passive MSI and active SAR; a common node for coordinated acquisition and co-registration; fused output; world-first qualification and applications.	When the integration of two sensing systems is the central concept you want the examiner to understand immediately.
Capability-versus-limitation matrix	Mission features; a short matrix comparing spectral information, cloud cover, darkness, resolution and applications; OptoSAR's proposed advantage; operational status.	When the strength of the answer lies in explaining why complementary sensors are useful, rather than simply naming them.
Innovation with a historical benchmark	Features and imaging methods; compare ESA's Envisat (2002), separate Sentinel missions and NISAR (2025); isolate GalaxEye's claimed commercial high-resolution, same-pass fusion; end with verification and Indian benefits.	When you want a precise answer that demonstrates technological history and avoids repeating the broad world-first claim uncritically.
Application-led explanation	Open with monsoon-related observation needs; identify Drishti's design; explain optical and radar measurements through crop, flood and maritime examples; establish the fusion novelty; conclude with operational qualification.	When the question permits applications to illustrate the science, provided the mission features and world-first explanation remain explicit.

The selection rule: Choose the presentation that makes the **working principles and the precise claimed novelty** easiest to see. None of the alternatives should omit the launch identity, treat radar as an ordinary camera, or equate a successful launch with verified delivery of fused images.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

7 Quick recall and Prelims crossover

Sixteen facts that connect Mission Drishti with satellite imaging, India's space-sector institutions and the important distinctions between claimed innovation and demonstrated capability.

1	**Mission Drishti launch: 3 May 2026**, 12:30 PM IST; GalaxEye's first satellite.	9	**SAR operating band: X-band**, **VV polarisation**.
2	**Launch vehicle and site: SpaceX Falcon 9**, Vandenberg Space Force Base, California; CAS500-2 rideshare mission.	10	**SAR imaging modes: stripmap** for extended coverage; **spotlight** for finer detail.
3	**Satellite mass:** approximately **190 kg**; described at launch as India's largest privately built Earth-observation satellite.	11	**Optical MSI: passive** sensing of reflected radiation; cloud cover and insufficient illumination are limitations.
4	**Orbit:** sun-synchronous low Earth orbit; advertised altitude **500 ± 10 km**.	12	**SAR principle: active** microwave sensing; synthetic aperture uses coherent echoes collected during sensor motion.
5	**Optical payload: seven-band MSI**, including coastal blue, red edge and near-infrared capabilities.	13	**OptoSAR claim:** coordinated, same-pass MSI and SAR acquisition with proposed integrated fusion; not the invention of optical-radar co-location.
6	**Advertised resolutions:** up to **0.9 m** SAR spotlight; **3.6 m** native MSI GSD; **1.8 m** fused product.	14	**Envisat:** ESA spacecraft launched **1 March 2002**; carried **ASAR** and **MERIS**, with combined observations demonstrated in 2002.
7	**NSIL-GalaxEye agreement: 12 February 2026**; resale of imagery and value-added solutions, including proposed SyncFused OptoSAR products.	15	**NISAR:** launched **30 July 2025** by ISRO; combines **L-band and S-band SAR**, not an optical imager with radar.
8	**GLX-SQ demonstrator:** GalaxEye SAR-processing payload on **POEM-4**, launched with PSLV-C60 on **30 December 2024**.	16	**7 July 2026:** GalaxEye reported loss of communication with Drishti; operational fused OptoSAR imaging was not publicly verified.

THE ONE SENTENCE TO CARRY OUT OF THIS DOCUMENT

Mission Drishti's significance lies not in inventing optical or radar imaging or same-pass observation, but in its claimed high-resolution commercial architecture for onboard OptoSAR fusion, whose operational performance still required validation.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

8 Write it yourself

Write the answer in 250 words without looking back, then check it against each line below.

	Check	Yes / No
1	Does the introduction identify **Mission Drishti, its Indian private developer and the purpose of integrating optical and radar observation**?	
2	Does Part 1 mention the **salient mission features**, including the launch, payload configuration and intended applications?	
3	Does Part 2 explain **passive multispectral imaging** through reflected radiation and **active SAR** through microwave echoes and synthetic aperture processing?	
4	Are the **distinctive capabilities and limitations** of both techniques clear, with relevant operational uses rather than generic claims about all-weather photography?	
5	Does Part 3 identify the **precise claimed world first**, explain same-pass fusion and distinguish it from earlier optical-radar satellite heritage and NISAR?	
6	Does a short final part explain **what the capability could add to India's Earth observation**, while distinguishing the successful May launch from the unverified operational imaging capability following the July anomaly?	
7	Is the answer **250 words or a little over**, including every heading and label, with a conclusion roughly matching the introduction's length and none of the incorrect claims listed in section 4.2?	

Sources

- **GalaxEye Space Solutions:** galaxeye.space, Mission Drishti launch page, confirming the launch on 3 May 2026 at 12:30 PM IST, Falcon 9, CAS500-2, approximately 190 kg mass, the advertised 500 ± 10 km altitude, four-day revisit and OptoSAR mission concept; galaxeye.space, technical payload specifications for seven-band MSI, X-band VV SAR, imaging modes, 0.9 m spotlight resolution, 3.6 m MSI ground sampling distance, 1.8 m fused product and sensor swaths; galaxeye.space, the SyncFused imaging concept and sensor-data processing architecture.
- **Prime Minister's Office, Press Information Bureau:** pib.gov.in, press release dated **3 May 2026, 3:16 PM IST**, congratulating GalaxEye on the successful launch and describing Mission Drishti as the world's first OptoSAR satellite and India's largest privately built satellite.
- **Ministry of Home Affairs, Press Information Bureau:** pib.gov.in, release dated **3 May 2026, 8:15 PM IST**, describing the claimed world-first OptoSAR configuration as combining optical cameras and all-weather radar.
- **Exolaunch:** exolaunch.com, CAS500-2 mission record; exolaunch.com, announcement of **3 May 2026**, confirming the Falcon 9 launch from Vandenberg and the deployment of 41 Exolaunch-managed customer satellites among the mission's 45 satellites.
- **NewSpace India Limited:** nsilindia.co.in, announcement dated **12 February 2026** confirming the NSIL-GalaxEye commercial agreement; nsilindia.co.in, NSIL and GalaxEye Reseller Agreement press release, describing the proposed SyncFused OptoSAR product, same-platform SAR and MSI acquisition, real-time onboard fusion and intended commercial applications.
- **Indian Space Research Organisation:** isro.gov.in, POEM-4 payload descriptions published on **22 December 2024**, including GalaxEye's GLX-SQ SAR Imaging Demonstration Payload and its proposed image-processing and compression capabilities. The PSLV-C60/SpaDeX mission launched on 30 December 2024.
- **ISRO, NISAR:** isro.gov.in, **24 July 2026** release on NISAR S-band SAR data products, identifying the NASA-ISRO L-band and S-band radar mission, 12-metre reflector, SweepSAR configuration and operational data dissemination.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

- **NASA:** science.nasa.gov, Get to Know SAR, explaining active microwave transmission, returned echoes, phase history, synthetic aperture formation and the principles behind high-resolution radar imaging.
- **European Space Agency, optical and radar satellite heritage:** esa.int, Sentinel-1 radar mission; esa.int, Sentinel-2 multispectral optical mission. These establish the prior existence of specialised radar and optical Earth-observation spacecraft.
- **European Space Agency, Envisat:** esa.int, **31 October 2002**, The Power of Two: Envisat Demonstrates Combined Imagery from Dual Sensors. ESA documents simultaneous observations using the Advanced Synthetic Aperture Radar (ASAR) and Medium Resolution Imaging Spectrometer (MERIS) aboard Envisat. This establishes that the broad concept of carrying and combining radar and optical observations on one satellite predates Drishti. esa.int confirms Envisat's launch on **1 March 2002**.
- **Indian National Space Promotion and Authorisation Centre:** inspace.gov.in, Indian Space Policy, 2023, particularly the provisions for non-governmental entities, the authorisation and supervisory role of IN-SPACe, and the distinct functions of ISRO and NSIL.
- **GalaxEye mission-status reporting:** economictimes.indiatimes.com, **7 July 2026**, reporting GalaxEye's acknowledgement of lost communication and low recovery likelihood; moneycontrol.com, **7 July 2026**, reporting the company's preliminary account of the anomaly and the spacecraft systems validated before communication was lost.
- **Union Public Service Commission:** upsc.gov.in, official Civil Services (Main) Examination question-paper archive. General Studies Paper III questions consulted: **2015 Q11; 2016 Q12; 2017 Q7; 2019 Q6; 2022 Q15; 2023 Q16; and 2026 Q15 and Q16**. The corresponding questions are identified by year, paper and question number in section 2.2.

Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind ?

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