Horizon Scanning the Satellite Sensor Market: Aligning Emerging Technical Capabilities with the Goldrush in Sustainability Data Products

CATAPULT Satellite Applications

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1	Water stress, insights for precision irrigation, assessing plant stress, optimising crop management, drought monitoring, agricultural water management.	THERMAL SENSORS
2	Monitoring crop health and disease, analysis of water cycles, impacts of droughts on crops, modelling of climate impacts, prediction of environmental risks, and optimisation of agricultural irrigation.	
3	Snow and ice melt dynamics, landslide forecasting near settlements, vegetation stress and water-use efficiency, urban heat island mapping.	
4	Early detection of water stress, monitoring plant growth, crop yield prediction, drought prediction, field-scale water productivity estimation, and soil composition estimation.	
5	Forecast crop yields, monitor water consumption, and assess drought conditions.	
6	Wildfire prevention and management, emissions mapping, crop health monitoring, and land use audit.	
7	Deforestation monitoring, fire risk modelling, and digital surface models.	
8	Urban heat island monitoring, wildfire tracking, deforestation monitoring, solar farm survey.	
9	Crop health monitoring, yield forecasting, climate-resilient infrastructure assessment, and monitoring carbon sinks.	
10	Real-time wildfire detection.	
11	Monitoring building heat loss and detection of heat stress in crops.	
12	Land-cover mapping, monitoring the biophysical and biochemical properties of crops, monitoring inland water bodies and coastal ecosystems, mineral identification, cryosphere monitoring, and soil properties.	HYPERSPECTRAL
13	Ecosystem monitoring and modeling, deforestation detection, water quality and pollution assessment, and land-cover mapping.	
14	Methane and carbon dioxide emission monitoring, biodiversity assessments, vegetation analysis, and minerals mapping.	
15	Mineral exploration, precision agriculture, methane leak detection, oil spill detection, vegetation health monitoring, soil composition analysis, and carbon offset verification.	
16	Forest health monitoring and crop classification.	
17	Monitoring crops and forecasting yields, monitoring water quality, tracking biomass growth, measuring carbon sequestration, and detecting emissions.	
18	Monitoring and assessment of biodiversity	
19	Accurate and reliable climate models, and calibrations for Earth observation (EO) data collected by other satellites.	
20	Harmful algal bloom (HAB) detection and monitoring, phytoplankton monitoring, water quality monitoring, and ocean colour phenomena mapping.	
21	Precision agriculture, monitoring deforestation, coastal erosion, and marine pollution.	
22	Early detection of crop diseases, water stress identification, real-time deforestation monitoring, and tracking ocean pollution.	
23	Mineral exploration, emission detection, and crop health monitoring.	
24	Precision agriculture and land use mapping.	
25	Methane detection, and measuring deforestation, ice melt, and rising sea levels.	
26	Iceberg tracking, sea-ice mapping and glacier ice flow, oil-spill detection, monitoring illegal fishing activities, and monitoring subsidence, uplift, landslides, earthquakes, and volcanic activity.	SAR
27	Globally calibrated and validated soil moisture measurement, measurement of aboveground woody vegetation biomass, monitoring the growth and loss of forests and wetlands, understanding sea level rise and its impact on coastal regions, understanding groundwater dynamics and distribution, and crop monitoring.	
28	Measuring forest biomass, monitoring deforestation and forest degradation, measuring paleo aquifers in desert regions, mapping subsurface geology and ice sheet dynamics, generating digital elevation models, and providing data for carbon cycle and climate modeling.	
29	Monitoring subsidence and flood mapping.	
30	Flood and typhoon mapping, and water resource management.	
31	Tracking land use changes, monitoring infrastructure health, surface deformation analysis, and flood mapping.	
32	Managing and mitigating flood risks, deforestation monitoring, land use change analysis, and infrastructure monitoring.	
33	Managing and mitigating flood risks, identifying oil spills, detecting marine illegal activities, and monitoring deforestation and desertification.	
34	Soil moisture measurement and managing and mitigating flood risks.	
35	Maritime surveillance and managing and mitigating flood risks.	
36	Detecting and measuring trace gases like O_3 (ozone), NO_2 (nitrogen dioxide), SO_2 (sulfur dioxide), HCHO (formaldehyde), and CHOCHO (glyoxal).	EMISSION DETECTION
37	Detecting and measuring a host of trace gases, including ozone, nitrogen dioxide, sulphur dioxide, formaldehyde, glyoxal, carbon monoxide, and methane, as well as aerosols and the UV index.	
38	Providing precise data on greenhouse gas emissions.	
39	Detecting methane emissions.	
40	Monitoring CO_2, CH_4, and NO_2.	
41	Detecting oil and gas methane emissions.	
42	Measuring the concentration of methane.	
43	Methane concentration.	

Notes: The lifespan of satellites is determined through online research. Some companies operate constellations of multiple satellites, which can help extend the overall mission lifespan. When the lifespan is not specified, an average design lifespan of six years is typically assumed for satellites. Satellites that have exceeded their intended lifespan but are still operational are not included in this discussion. The use cases and capabilities mentioned here are based solely on information from companies' websites or related online content. While the sensors can support multiple use cases, this list focuses on the primary use cases projected by the companies. Additionally, the same sensor may be capable of other use cases not listed here.

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