



ASTROFICA

TECHNOLOGIES

H2OPE-SAT Constellation: A Hyperspectral Space-Based Solution for Water and Agricultural Monitoring and Management

Registration Number: 2016/027204/07

Income Tax Number: 9028634245

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Company Profile

Astrofica Technologies Pty (Ltd) is a **fully black-owned (Level-1 BEE)** and **technically competent technology engineering solutions provider** with key skills in system integration, telecommunications, renewable energy and transportation. Our vertical competencies include the management, planning and execution of high-technology programs together with experience and networks in supply chain management, procurement and manufacturing. Through our **combined experience of over 30 years in satellite and related engineering industries**, and in addition to our vast network of partners across various industries, we are able to assist our clients in realizing technologically advanced systems whilst creating long-term value for them.



Vision

Enabling high technology value innovation through servant leadership.

Mission

Utilizing our extensive knowledge, skills and experience in high-technology industries to advance the growth and success of our clients and societal well-being.



We are trained and certified in **systems and acquisition management processes** in conjunction with required concurrent engineering. Our **multidisciplinary experience** allows us to provide upstream and downstream clients with high-quality, cost-effective and sustainable solutions from exploration of system requirements and project feasibility analysis to **integrated turnkey solutions and commercial operations**.

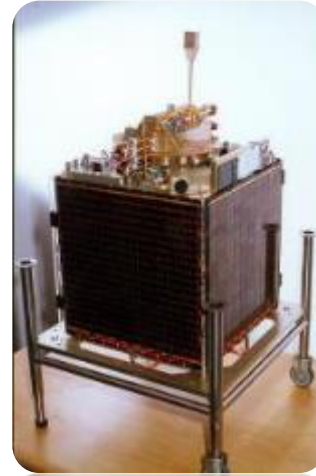
We also understand the importance and value of **training and knowledge transfer** to our clients and provide general and client-specific training programs as integral parts of our overall value-add service.



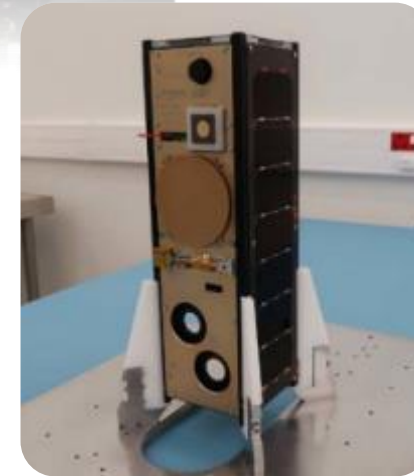
A Proud Shared History



1985 -



CONFIDENTIAL



- 2020

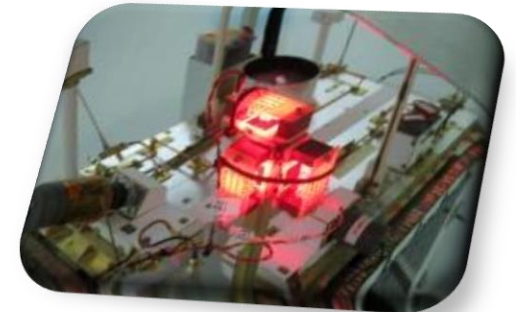


Experience

- Satellite Integration experience : 30 years
- AIT successfully delivered satellites : 5
 - > (local and International , total mass range > 1,250 tons)
- Launch Campaigns : 4

Skills and Specialties

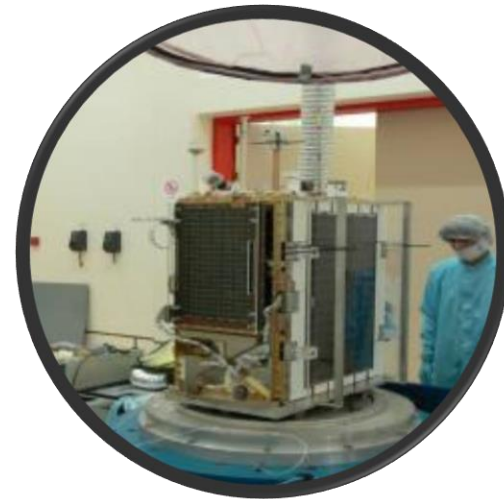
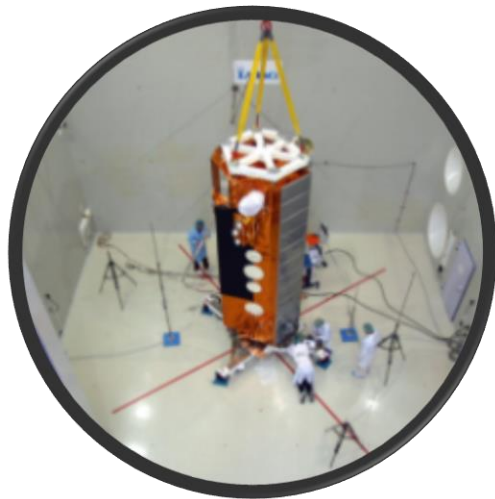
- System Engineering, Program Management, Project Management, Contract Management on various satellite systems
- Effective AIT Team Planning. Develop and manage various AIT test plans & procedures as required by the mission
- Manage, support and review sub-systems & satellite tests during AIT & EVT lifecycles
- Manage and optimize all environmental satellite tests phases according to project schedule and budget
- Hands on mechanical AIT and software AIV
- Mission Control System Software development expertise
- Satellite commissioning and operations support





Skills and Specialties

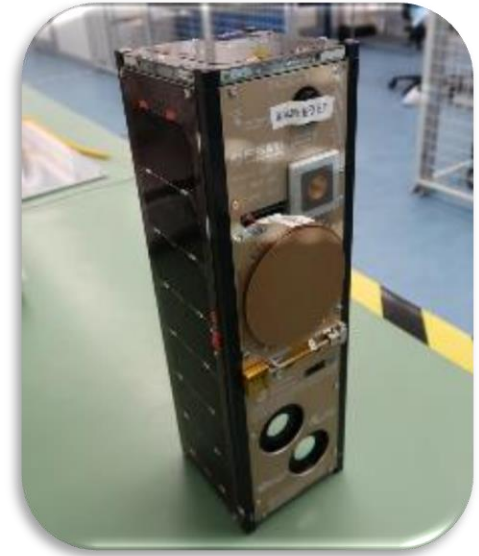
- Adherence to AIT processes and industry standards (safety included)
- Always ensure highest standards for reliable and operational systems
- Satellite integration facilities establishment, management and maintenance expertise
- Ground support equipment (GSE) and groundstation (GS) expertise
- Harness engineering expertise
- Launch site experience carrying out final satellite tests and pre-launch health checks
- Utilising expertise from previous satellite missions in developing better processes, solutions and applying new AIT methods to current and future projects.





2018 Completed Projects

Assembly, Integration and Testing of ZA-CUBE2 – 9-month contract, successfully completed. Mission reference: <https://directory.eoportal.org/web/eoportal/satellite-missions/v-w-x-y-z/zacube-2>



Comprehensive scoping and analysis of the South African Space Industry Development Policy Framework for the Department of Trade and Industry (DTI) together with Blueprint Holding (Pty) Ltd 8-month contract – successfully completed.

Astrofica was part of the technical team that drafted a Masterplan for Aerospace and Defense sector. It was successfully completed and approved.

In the last quarter of 2020 Astrofica was awarded 3 year a contract outside the Space Sector for Spectrum Monitoring

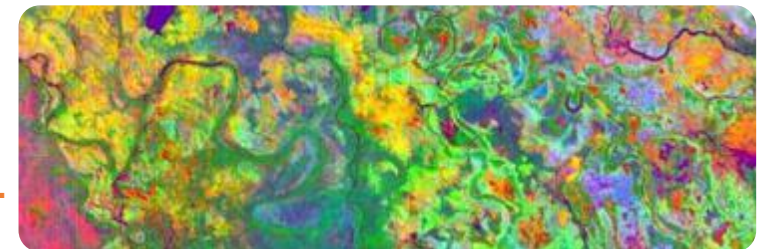


Market Opportunity and Commercial Value Gap

Astrofica's hyperspectral satellites will be able to address the above challenges. With fresh daily data, we will be able to monitor and identify changes in our fragile aqua ecosystems, both along the coast and inland. Together with industry 4.0 manufacturing processes (4IR), on-board artificial intelligence, machine learning and change detection algorithms, the overall end-to-end system will be able to:

- Identify growth and type of harmful algal blooms in a specific geographical area before they become a major problem;
- Provide an holistic view of the water and crop quality within a specific geographical area;
- Provide a comprehensive solution of an entire waterbody or crop field in spatial and temporal resolution;
- Create a comprehensive historical record of HAB growth and movement in addition to water quality within a geographical area;
- Refine crop models and productivity benchmarks with high cadence NDVI (normalized differential vegetation index);
- Provide fresh data to monitor vegetation changes to optimize efficiency, profitably, and sustainability; and
- Prioritize early assessment management action and interventions.

Astrofica is ahead of the curve with the implementation of hyperspectral imagery below 10m ground resolution which is currently the quality and standard of choice driving future trends.





Economic Impact to South Africa

The South African west and south coasts suffer from the frequent occurrence of Harmful Algal Blooms (HABs). These blooms can have considerable negative impacts on commercial marine concerns such as rock lobster and aquaculture operations, in addition to local marine ecosystems and communities. Examples of typical rock lobster loss for large events range from 200 to 2000 tonnes, with an estimated direct economic loss of ± 8 USD to 80 million USD per event, in addition to the indirect ecosystem and sustainability impacts. In Feb 2015, 200 tonnes of cape rock lobster suffered from hypoxia and exited the ocean with 80% mortality. The economic value of the event was estimated at R114 million.

Annual contribution to GDP: R200M
 Retail Price: ~US\$38-42/kg
 Economic value of Event: R114M
 57% of annual GDP contribution

200 tons



2015

Cape crayfish stage another 'walkout'
 SOUTH AFRICA | 28 FEBRUARY 2022, 1:55PM / HENRI DU PLESSIS

Annual contribution to GDP: R1.02 Bn
 Retail Price: ~US\$1200/ton
 Economic Effect of 2017 Evnt: R70-R140M
 10% of annual GDP contribution



2017

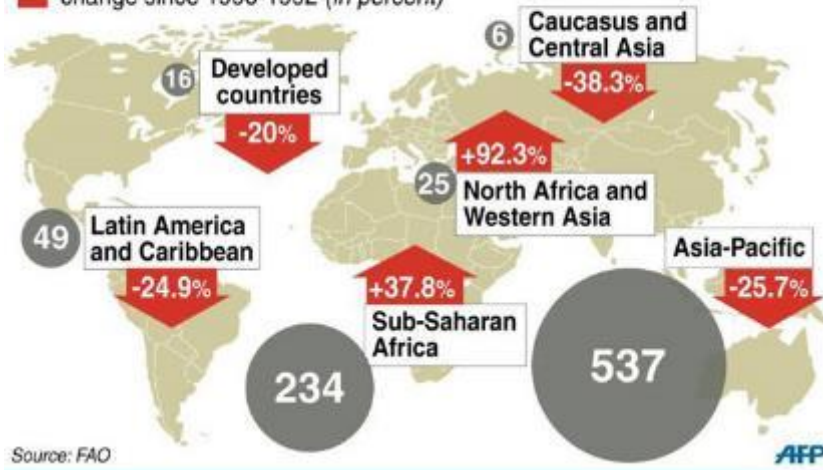


Agri Challenge: Food Security Threat

Global hunger

868 million people are chronically undernourished worldwide, down from 1 billion in 1990-92 but still "unacceptably high"

- number of chronically undernourished people in 2010-2012 (in millions)
- change since 1990-1992 (in percent)



Source: FAO

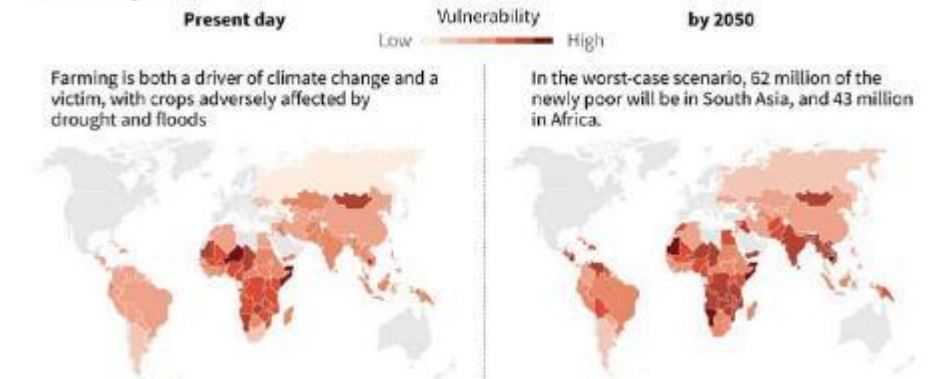
two major global trends, population growth and climate change leading to global warming, have already resulted in significant stress on the food provision systems around the world. As temperatures rise, rainfall patterns change, and pests and diseases find new areas to inhabit or spread to, all of which pose significant new risks to food and farming.

The food security threat posed by climate change is one of the greatest challenges facing the African continent.

As the world's population continues to surge, there are mounting concerns about how agricultural production will cope with feeding everyone. The Food and Agriculture Organization of the United Nations (FAO) estimates that food production must increase by at least 60% to respond to the demands of the nine billion people that are expected to inhabit the planet by 2050.

Global warming threat to farmers

The impact of climate change on food security could sink up to 122 million more people into extreme poverty in the coming decades



Source: Met Office Hadley Centre and WFP 2015, FAO of United Nations

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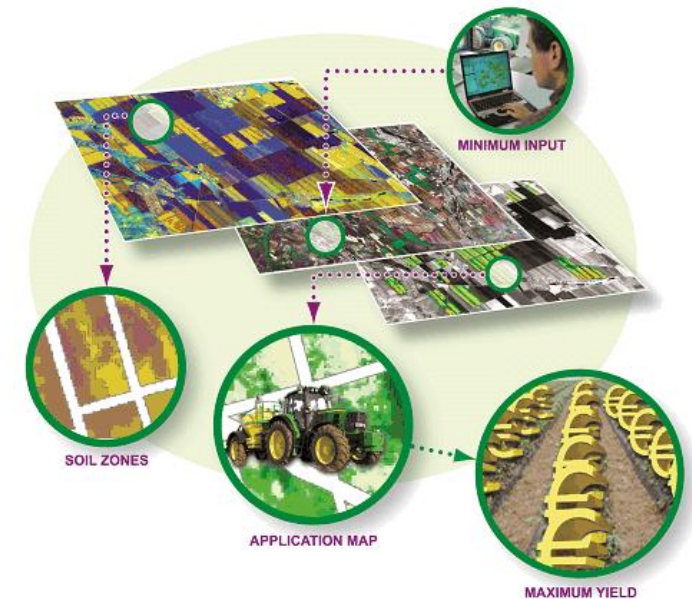


Climate Smart Agriculture (CSA)

“The food security threat posed by climate change is one of the greatest challenges facing the African continent”... “As African ministers responsible for agriculture, we want to go to the COP 17 conference with one idea of pushing for climate-smart agriculture.”

Agriculture, Forestry and Fisheries Minister Tina Joemat-Pettersson.

The impact on food production techniques and chains is very significant. There is a growing recognition of agriculture’s contribution to climate change, and of the means by which farming systems can adapt to cope with the changes, as well as the potential of agriculture to mitigate climate impact. This recognition has led to the concept of ‘climate-smart agriculture’ (CSA), agricultural techniques that sustainably increases productivity, enhances resilience, reduces/removes greenhouse gas emissions where possible, and enhances achievement of national food security and development goals. Key to climate smart agriculture is precision agriculture, a farming management concept based on the use of satellites and drones to observe, measure and respond to inter and intra-field variability in crops.



**For more detailed information
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