LUCID CIRCUIT
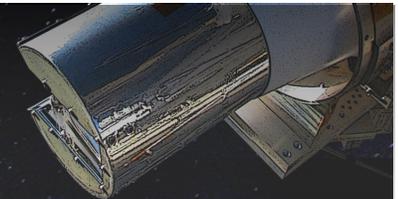
Astrum

AI CHIP FOR SMALL SATELLITES

MODERN COMPUTE HARDWARE LIMITATIONS

It is challenging to develop high-performance, energy-efficient solutions for complex modern applications (such as machine learning and classification) due to the limitations of available purpose-built high-risk, high-cost hardware. As a result, current solutions are not suited for treating information **at the edge** where it is created. Not only is there no way to verify the quality of collected data, but also once data leaves the edge, there is no reliable way to ensure the consistency of that information. This is a significant risk. As a result, any analysis is delayed and is more expensive as larger amounts of data and processing are required. Reliably learning at the edge necessitates a new type of processing architecture and approach to data integrity.

THE LUCID CIRCUIT SOLUTION

Astrum™ — Runtime-Adaptable, Resilient, Energy-Efficient Processors

Astrum™ provides Direct-to-User Analytics straight from the small satellite. Astrum™ leverages technologies that make it **Space Robust** and **Low Power** for small satellites. Astrum™ equipped small satellites enable ground stations to download the much smaller payload of the analytics data – so a single pass over a single ground station would suffice, rather than the multiple passes or complex communication relaying currently required for a complete download. Not only will this stave off the need for huge networks of ground stations, but it also means that analytics can become available in real time to an analyst anywhere in the world. This capability will become crucial for strategists who deal with emergencies and save lives.

The Astrum™ Advantage

Onboard Machine Learning

Astrum™ processors leverage an adaptable low-power, high-performance compute fabric that combines runtime-reconfigurable architectures and support for heterogeneous integration. The analysis capabilities of Astrum™ enables geospatial analytics in real-time, processing data as it is collected and before it is sent back to Earth.

Resilient Data Integrity

Astrum™ is specifically designed using a patented technology to withstand the harsh conditions of space. This design prevents chip failures and ensures data collection is not disrupted before onboard analytics and data transmission back to Earth. Astrum™ also supports end-to-end encryption, ensuring that data sent remains private and secure.

Information Traceability

The immutable in-silicon digital fingerprinting feature allows each Astrum™ chip to specifically tag data with a key that is unique to each chip. This makes it possible to trace data entry all the way to the specific Astrum™ Processor microchip within the specific piece of equipment and (date) instance (when) it was created.

Astrum™ Features:

- Security Focused
- High Performance
- High Flexibility
- Power Efficiency
- Programming Ease
- Runtime-Adaptable

High-resiliency and Radiation-Tolerant options for Aerospace and Defense applications.