

Lab-Quality Results from a Simple Finger Prick

AIDA: Artificial Intelligence Assisted Diagnostic Platform

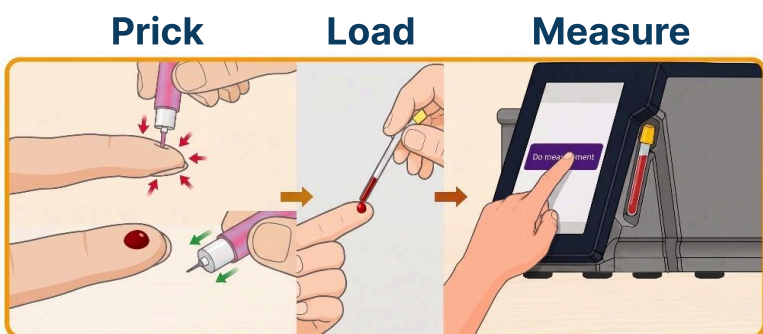
The Device



What It Measures

- **27 haematology parameters**, full 5-part white-cell differential
- **38 µl of whole blood** per run — a single finger-prick capillary sample
- WBC with LYM/MON/NEU/EOS/BAS counts and percentages; RBC, HGB, HCT, MCV, MCH, MCHC, RDW; PLT, MPV, PCT, PDW, PLC-R%, PLC-C; NLR
- Dual measurement principle: multi-angle flow cytometry with kinetic spectrophotometry (optical) plus Coulter impedance with hydrodynamic focusing (RBC/PLT)

How It Measures



AI On Board

On-board AI-assisted trend analysis across a crew member's measurement history, supporting flight-surgeon interpretation and, on non-LEO missions, crew-autonomous assessment.

The Problem

Human spaceflight has so far relied on evacuation: if a crew member falls ill, bring them home. Beyond low Earth orbit that option disappears, and communication delay rules out real-time support from the ground. Today there is no qualified haematology capability in orbit.

The Response

European Knowledge Centre Ltd. and **Airbus Defence and Space** are developing AIDA — an analyser that delivers a full laboratory blood count on board, in about a minute, from a single finger prick.

AIDA adapts a certified commercial haematology analyser — the Norma Instruments Icon 5 OP (NI5 Analyser) — for the ISS Columbus module, paired with an onboard AI compute node. Results are analysed on board and encrypted for downlink to flight surgeons.

Why It Matters

The changes start in the first weeks — red-cell destruction rises as soon as crew reach orbit and stays elevated all mission (+54% over six months [1]). RBC, HGB, HCT and RDW show space anaemia developing on orbit, not at landing.

Numbers when an event cannot wait — an occlusive jugular-vein thrombosis was found in an ISS crew member around day 50 of flight [2]. Platelet count, MPV and neutrophil-to-lymphocyte ratio reach the flight surgeon in minutes, supporting the work-up on orbit.

An enabler for exploration — needed where evacuation is not an option and the ground is minutes away by radio.

Applicable on Earth — the same finger-prick, no-laboratory operation suits remote and resource-limited care.

3 Spaceflight Adaptations

- A sealed capillary port replaces the gravity-fed sample vial;
- Every internal fluid path is closed and made gravity-independent, with an inline mixer designed to replace the open mixing chamber;
- A plug-and-play cassette holds reagents and waste in one volume-neutral loop.

Sources

- [1] Trudel G. et al., Hemolysis contributes to anemia during long-duration space flight, *Nature Medicine* 28, 59–62 (2022).
- [2] Marshall-Goebel K. et al., Assessment of Jugular Venous Blood Flow Stasis and Thrombosis During Spaceflight, *JAMA Network Open* 2(11):e1915011 (2019).

