


# Critical Mineral Projects

Xcalibur Smart Mapping



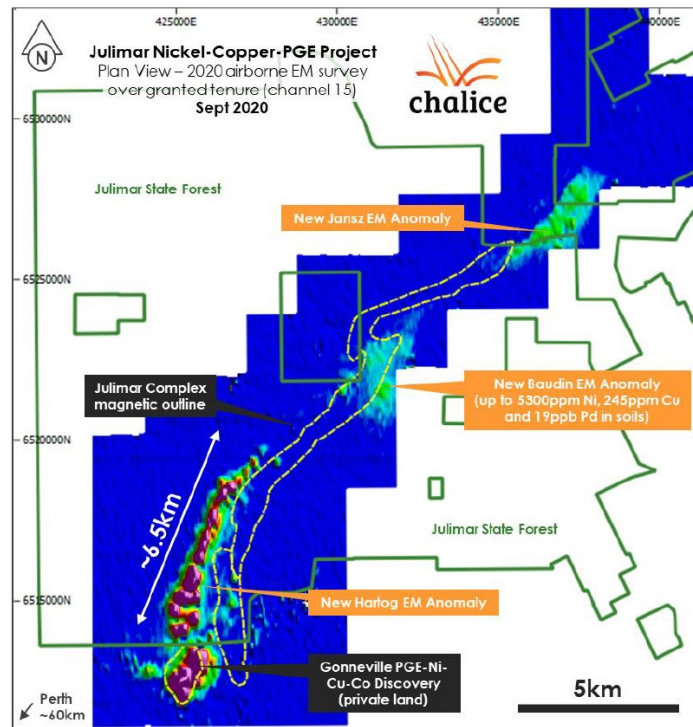
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## Julimar Palladium-Platinum-Nickel-Copper-Cobalt-Gold Deposit, Western Australia

In 2020, Chalice Mining announced a new greenfield PGE-Ni-Cu-Co-Au discovery at Julimar, 70km NE of Perth, Western Australia.

The discovery hole was on the southern end of a 26km intrusive body; however, exploration was limited to a 1.6km x 800m area due to lack of ground access to most of the area being covered by a State Forest. To assess the prospectivity of the restricted State Forest area, Chalice commissioned a Helitem<sup>2</sup> helicopter time domain electromagnetic survey targeting extensions of the sulphide orebody.

The Helitem<sup>2</sup> survey covered the entire 155km<sup>2</sup> of Chalice’s granted tenure with 200m line spacing and was flown using a low Tx base frequency of 6.25Hz to provide maximum exploration depth, and maximum sensitivity to the highly conductive Ni-sulphide orebodies in the areas.



*Julimar Complex Plan View – Airborne EM survey preliminary mid-time response. (Chalice 22 Sep 2020)*

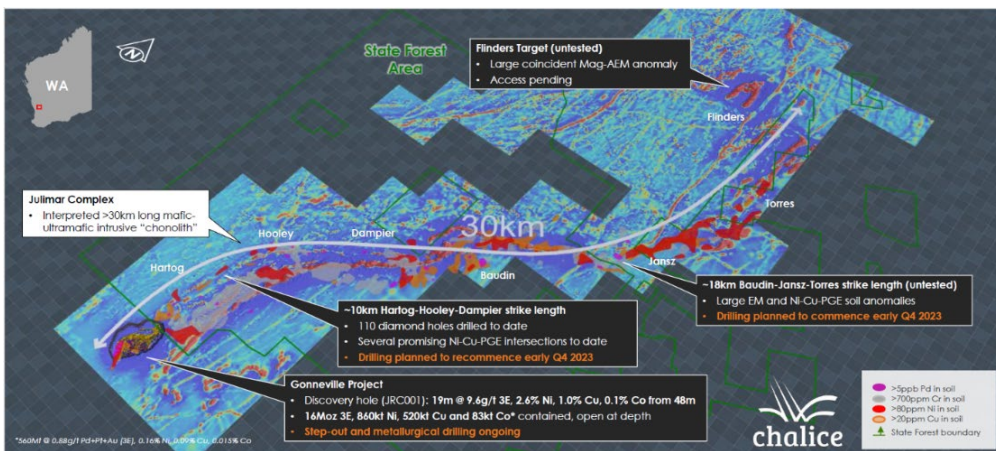
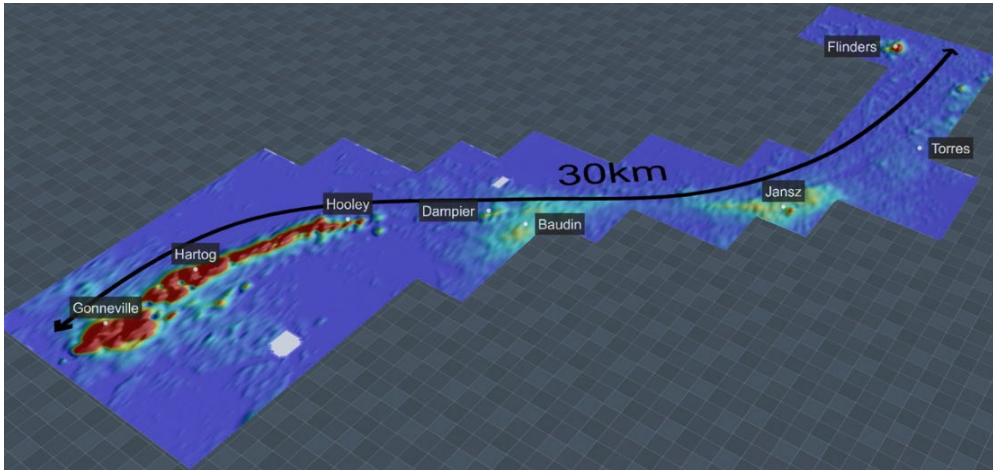
The Helitem<sup>2</sup> survey identified a major new 6.5km long EM anomaly at Julimar, and extensive new EM anomalies over 30km of strike, and opened a new and highly prospective mineral region since named the West Yilgarn province.

Commenting on the results, Chalice’s Managing Director, Alex Dorsch, said:

*“We have speculated for some time that the area north of our recent Gonnevile discovery is highly prospective. We have now supported that claim with major new, laterally extensive geophysical targets from the first airborne EM survey over the Company’s granted tenure, which is a very exciting and important*

development. Airborne EM is an effective first-pass screening technique that can detect shallow conductive sources, such as nickel sulphide mineralisation...” (Chalice 22 Sep 2020)

Environmental approvals to the State Forest have since been received, allowing access to, and exploration in, the State Forest areas within strict environmental conditions. Drilling continues to add resources to the initial discovery, Gonneville, as well as define new resources in the areas defined by EM within the State Forest.



3D view (looking NW) of the >30km long Julimar Complex, Gonneville Deposit and Regional Targets. Top image – Helitem<sup>2</sup> EM Response, Bottom Image – Resource Development Activities

Ref Chalice – Morgans Conference PPT 18 Oct 2023

As of 27 Mar 2023, the Mineral Resource Estimate at the Gonneville Deposit stood at 560 million tonnes containing 560 m tonnes containing 860,000 t of Nickel, 520,000 t of Copper, and 83,000 t of Cobalt, 13 million oz of Palladium, 2.7 million oz of Platinum and 480,000 oz of Gold.

Ref: Chalice ASX Press Release, 22 Sep 2020 <https://chalicemining.com/wp-content/uploads/2022/12/6996962.pdf>

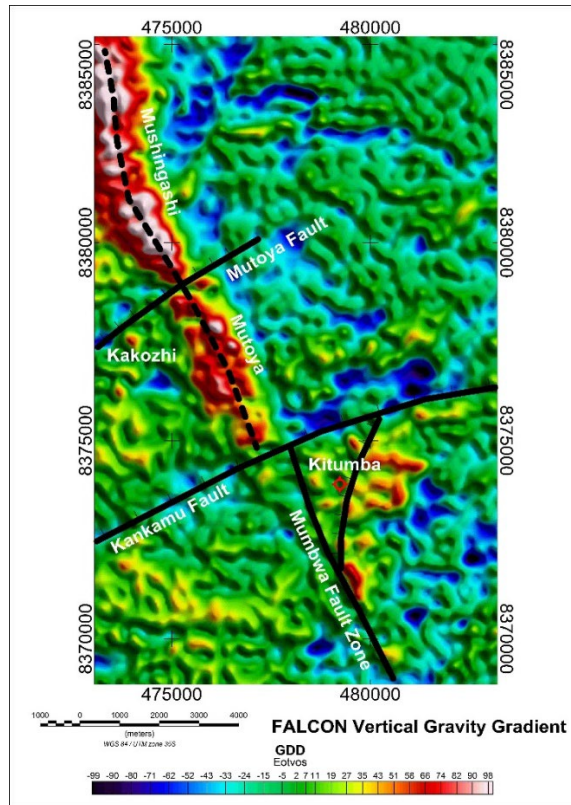
Ref Chalice – Morgans Conference PPT 18 Oct 2023 <https://chalicemining.com/wp-content/uploads/2023/10/61174702-1.pdf>

## Kitumba Copper-Cobalt-Gold-Uranium Discovery, Mumbwa, Zambia

The Mumbwa Iron Oxide Copper Gold (IOCG) exploration project is located in west-central Zambia. In 2004, an 8,700 line km FALCON® airborne gravity gradiometer (AGG) survey acquired high resolution gravity gradiometry, magnetics and radiometric data over the project.

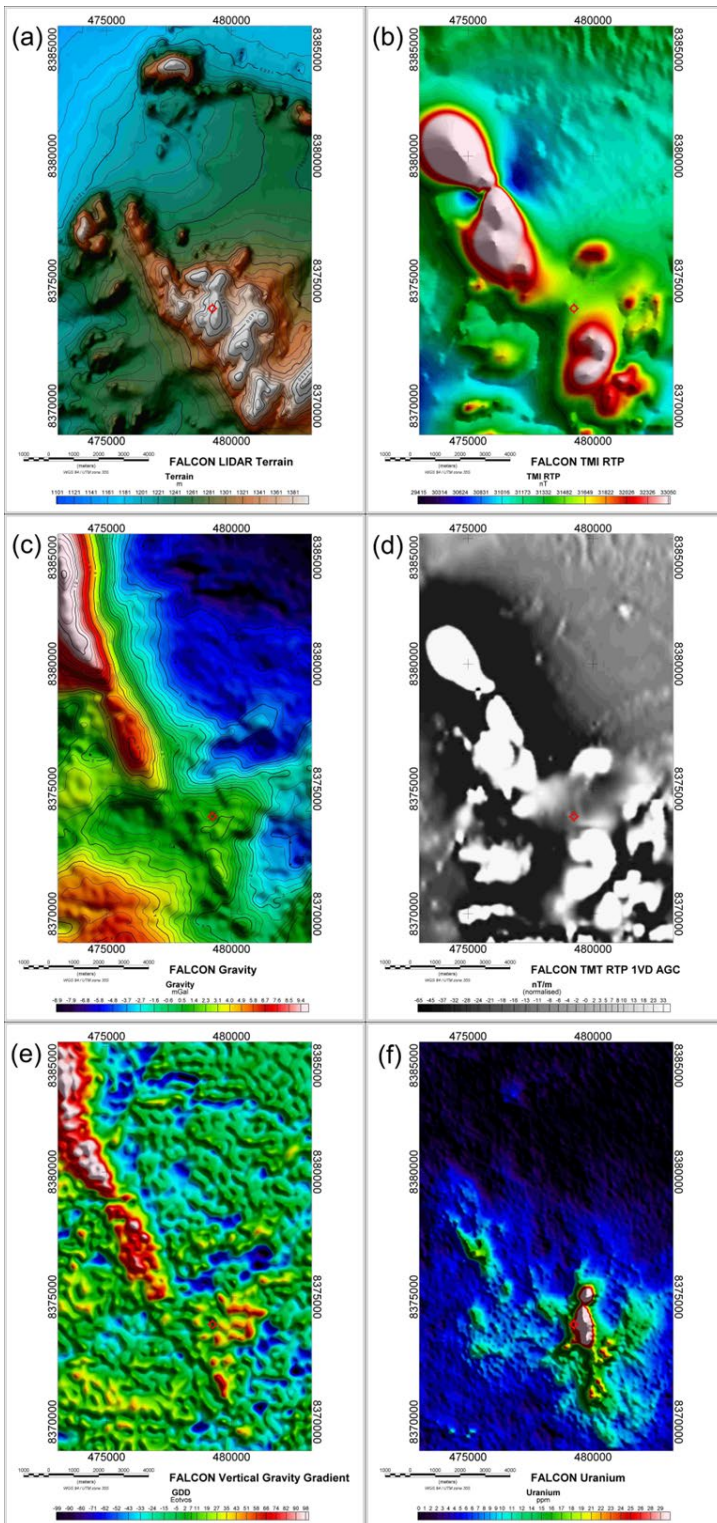
The FALCON datasets delineated four high-priority IOCG prospects Kitumba, Kakozhi, Mutoya and Mushingashi, that together comprise a giant mineralised IOCG alteration system distributed over 26km long structural corridor, and under 250-300m of cover. The data catalysed further exploration efforts and drilling leading to the Kitumba discovery in 2007.

By July 29 2015, the Total Resource at Kitumba stood at **27.9 million Tonnes, grading 2.2% Cu, 0.23% Co, 0.04g/t Au and 27ppm U.** (Source: miningdataonline).



*FALCON AGG Vertical Gravity Gradient data – over the Kitumba, Kakozhi, Mutoya and Mushingashi prospects. The Kitumba discovery drill hole, S36-001 is shown along with major faults. (Christensen and Whiting, 2013)*

Mumbwa FALCON AGG Survey - All Datasets (Christensen and Whiting 2013)



- (a) FALCON Digital terrain model from LIDAR scanner data.
- (b) FALCON Total Magnetic Intensity – Reduced to the Pole (TMI RTP).
- (c) FALCON AGG Bouguer Gravity– terrain corrected at 2.67 g/cm<sup>3</sup>.
- (d) FALCON TMI RTP with First Vertical Derivative (1VD) and Automatic Gain Control filter.
- (e) FALCON AGG Vertical Gravity Gradient – terrain corrected at 2.67 g/cm<sup>3</sup>.
- (f) FALCON Uranium equivalent concentration. The Kitumba discovery drill hole, S36-001 is shown.

The Mumbwa systems exhibit classic regional and local scale physical properties of world class IOCG deposits. The FALCON datasets provided identified and mapped the following key IOCG geological signatures:

- On a regional scale the FALCON AGG and magnetic data identified and mapped igneous intrusions, as well the regional-scale fault structures and associated geological boundaries; all prerequisites for prospective IOCG terrains.
- The FALCON AGG and magnetic data delineated four individual IOCG prospects that together comprise a giant mineralised IOCG alteration system distributed over a 26 km.
- The FALCON AGG and magnetic data mapped the intersections, offsets, bends and jogs of the regional faults and structural lineaments, identifying the Kitumba as particularly amenable to IOCG mineralization.
- The FALCON AGG and magnetic data accurately delineated the spatial extent of the Kitumba and Mutoya IOCG prospects. 3D inversion of the magnetic and gravity gradient data enabled further mapping of the alteration systems.
- The FALCON AGG radiometric data delineated and upgraded the Kitumba and Mutoya prospects through identification of significant uranium anomalism, upon which the Kitumba discovery hole S36-001 was sited.

Following ground reconnaissance work in the mid-late 1990s, the 2004 FALCON AGG gravity gradiometry, magnetic and radiometric datasets were instrumental in advancing the IOCG exploration efforts in the Mumbwa area, minimising technical risks, and led to the Kitumba discovery in 2007.

Ref: Asbjorn Christensen and Tom Whiting "The role of FALCON® AGG in the Mumbwa, Zambia, Iron Oxide Copper-Gold discovery." [13th SAGA Biennial Conference & Exhibition](#), Oct 2013

DOI: [https://doi.org/10.3997/2214-4609-db.378.SAGA2013\\_DAY2\\_SESSION\\_6C\\_Christensen](https://doi.org/10.3997/2214-4609-db.378.SAGA2013_DAY2_SESSION_6C_Christensen)

Mining Data Online <https://miningdataonline.com/property/1068/Kitumba-Project.aspx#Reserves>