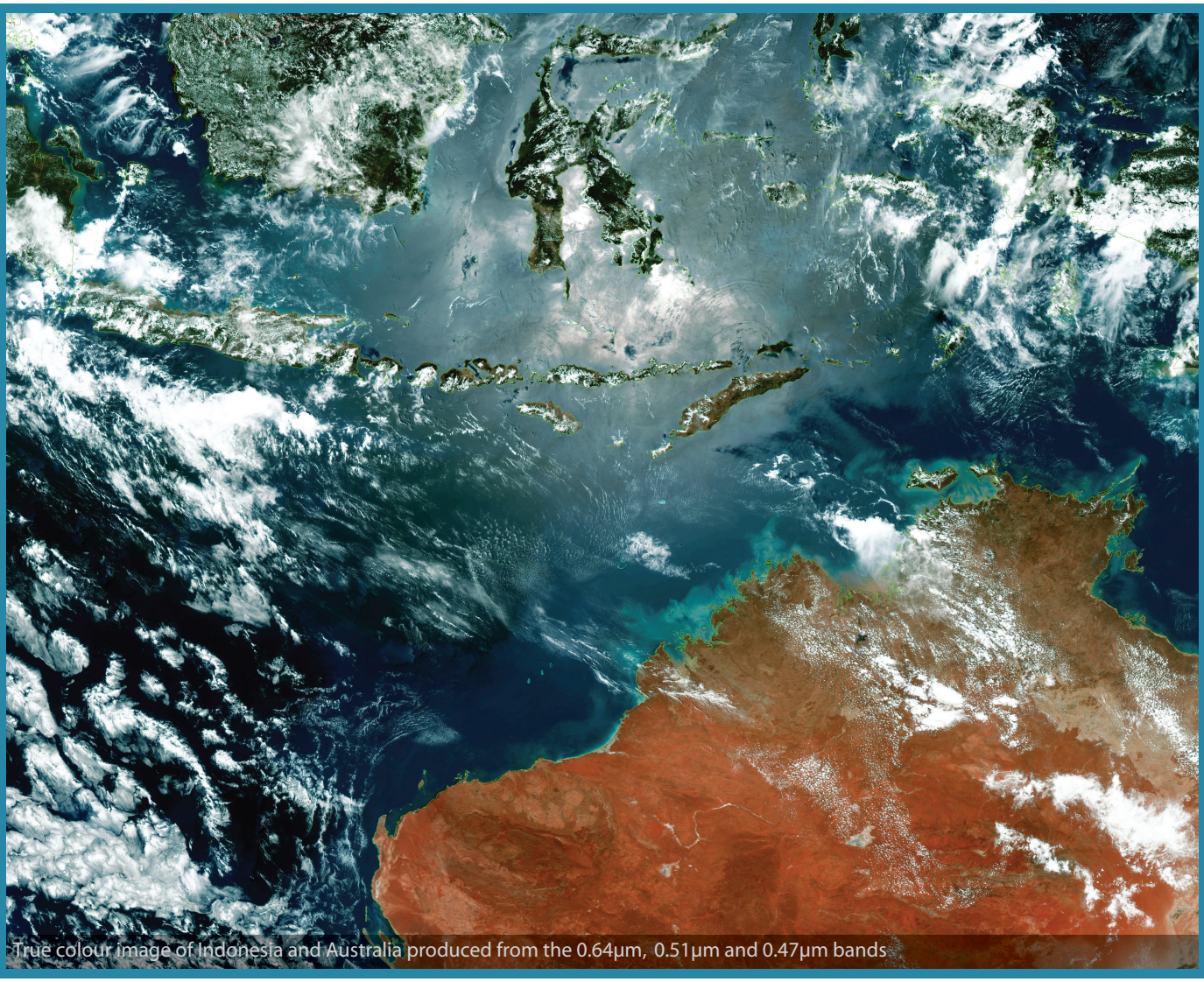
Dartcom

WEATHER SATELLITE AND REMOTE SENSING GROUND STATIONS

Grafinta
Avda. Filipinas, 46
28003 Madrid
Tfo. 91 5537207
Fax 91 5336282
E-mail grafinta@grafinta.com

UHRIT System

Reliable, high-performance system for receiving, archiving, processing and displaying ultra-high resolution data from the GEO-KOMPSAT-2A (GK-2A) satellite



True colour image of Indonesia and Australia produced from the 0.64µm, 0.51µm and 0.47µm bands

The Dartcom UHRIT System can receive, archive, process and display ultra-high resolution (UHRIT) data from the GEO-KOMPSAT-2A (GK-2A) satellite.

GK-2A transmits UHRIT data via a 31Mbps DVB-S2 X-Band downlink, as well as LRIT and HRIT data via L-Band downlinks supported by the Dartcom LRIT/HRIT System. DVB-S2 provides enough bandwidth for the 16 spectral bands produced by the Advanced Meteorological Imager (AMI) sensor at up to 500m resolution on a 10 minute repeat cycle.

Various meterological products are also transmitted in NetCDF format, including Rainfall Rate (RR), Sea Surface Temperature (SST) and Cloud Top Products (CTPS).

The service area includes Korea, China, Indonesia, Malaysia, Philippines, Thailand, Vietnam, Taiwan, Japan and Australia.

Ingested data can be viewed and processed using the Dartcom iDAP/MacroPro software. Outputs are also available for image processing software such as PCI Geomatica, ERDAS IMAGINE and ENVI/IDL, as well as standard interchange formats such as GeoTIFF.

Components

- **Antenna** – prime focus parabolic dish, 3.7m or 4.5m diameter depending on location (see the *Antenna requirements* section) with scalar horn feed and X-Band LNB. Optional X-Band filter if co-sited with X-Band weather radar.
- **Receiver** – DVB-S2 demodulator with Ethernet data output.
- **Ingest and visualisation PC** running Dartcom XRIT Ingester and Dartcom iDAP/MacroPro software. Supplied fully set-up and tested for a turnkey solution.

Dartcom can also provide installation and training services.

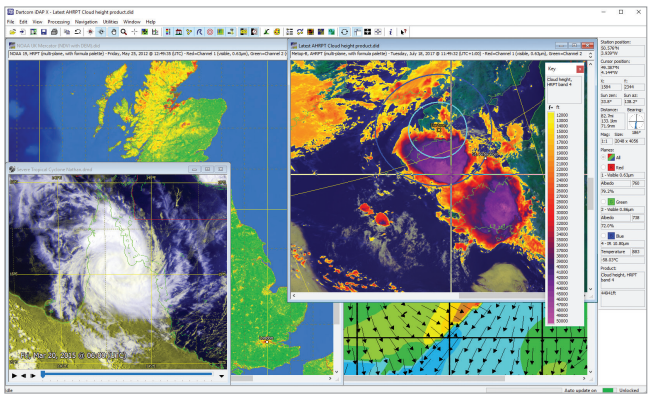
Features

- Direct reception of UHRIT data from the GK-2A satellite.
- Eliminates the need for a costly high-bandwidth, high-reliability internet connection to KMA/NMSC to receive data via FTP, which in any case is available only to national meteorological offices.
- Provides more resilience during severe weather events which can cause failure of telecommunications infrastructure.
- 16 spectral bands with high spatial resolution – 500m or 1km for visible and near infra-red, 2km for infra-red.
- Fast imaging and frequent updates – full disks of all 16 bands are scanned and transmitted within 10 minutes, every 10 minutes.
- Fully automatic reception, decryption, decompression, archiving, output and processing.
- Proven, robust, reliable hardware and software.
- Comprehensive hardware and software diagnostics at all levels, with on-screen and email alarms, and full logging if required.

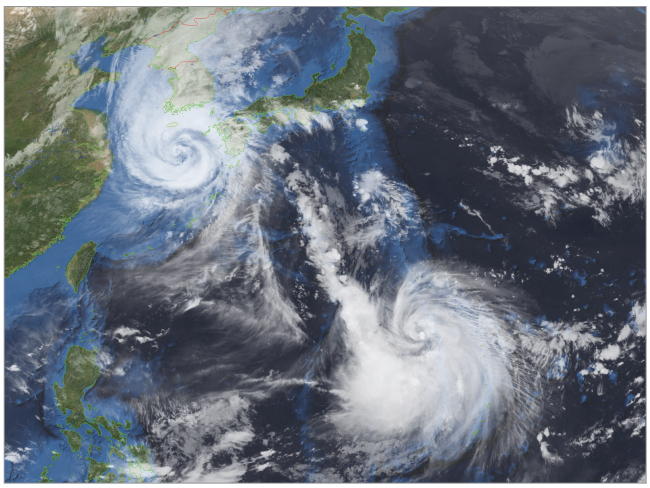
Please note that a decryption key is required to receive GK-2A UHRIT data. Customers must apply for one from KMA/NMSC.

Software

- **Dartcom XRIT Ingester** – provides automatic ingest, archiving and output of UHRIT data.
- **Dartcom iDAP** – provides a wide range of image manipulation and processing facilities such as animation, enhancement, product creation, reprojection, masking, printing and exporting to third-party file formats.
- **Dartcom MacroPro** – automates the image processing facilities provided by iDAP.



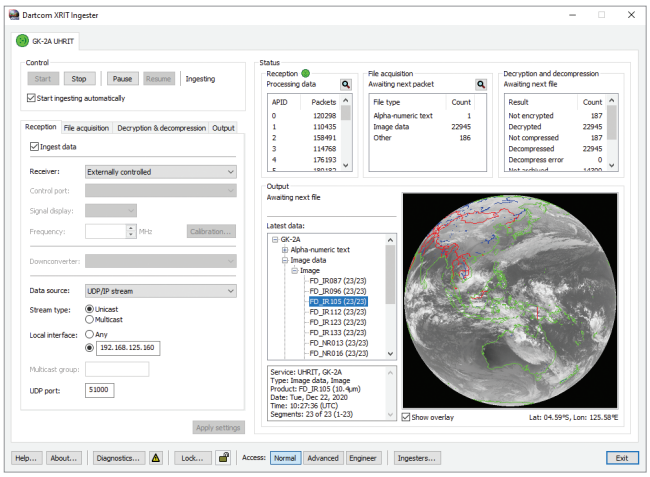
Dartcom iDAP and MacroPro software



Typhoons *Maysak* and *Haishen* in September 2020, produced from the 10.5µm infra-red band with a Blue Marble mask applied using the Dartcom iDAP software

AMI (Advanced Meteorological Imager) spectral bands

Type	Central wavelength	Resolution	Special purpose
Visible	0.470µm	1km	Blue
	0.511µm	1km	Green
	0.640µm	500m	Red
Near infra-red	0.865µm	1km	
Short wave infra-red	1.380µm	2km	
	1.610µm	2km	
Medium wave infra-red	3.830µm	2km	
	6.241µm	2km	Water vapour
	6.952µm	2km	
	7.344µm	2km	
Thermal infra-red	8.592µm	2km	
	9.625µm	2km	
	10.403µm	2km	
	11.212µm	2km	
	12.364µm	2km	
	13.310µm	2km	



Dartcom XRIT Ingester software

Hardware

Antenna

- Glass-fibre reinforced precision compression moulded polyester parabolic reflector with eight segments.
- Galvanised steel azimuth/elevation mount and pedestal.
- Scalar feed horn with adjustable polarisation (LHC or RHC).
- X-Band LNB.
- Optional X-Band filter if co-sited with X-Band weather radar.
- 50m of Ecoflex 10 50Ω co-axial cable.

Receiver

- DVB-S2 demodulator.
- Fully compliant with GK-2A downlink specifications.
- Monitoring and control via front panel or web interface.
- Data output via gigabit Ethernet.

Ingest and visualisation PC

- Intel Core i7 processor with 8 cores and 16GB RAM.
- Dedicated graphics with support for multiple monitors.
- Storage configurable according to customer requirements.

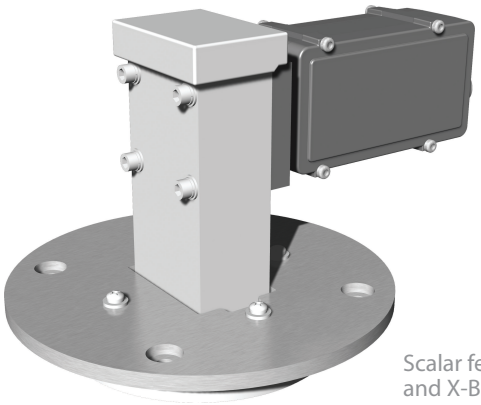
Parabolic reflector specifications

	3.7m antenna	4.5m antenna
F/D ratio	0.37	0.3
Gain @ 8200MHz	47dBi	49dBi
Polarisation	Linear	Linear
G/T @ 5˚ elevation	26.7dB/K	28.5dB/K
Operational wind	72km/h (39kt)	72km/h (39kt)
Survival wind	201km/h (109kt)	201km/h (109kt)

Scalar feed horn and X-Band LNB specifications

Feed type	Scalar horn
Polarisation	LHC or RHC (adjustable)
Noise figure	0.6dB typical
RF input	7750–8400MHz
LO frequency	6950MHz
IF output	800–1450MHz
Gain variation	±0.4dB maximum within 30MHz, ±3dB over band
Conversion gain	60dB typical
Image rejection	>40dB
Input/output impedance	50Ω
LNB input interface	WR-112 waveguide flange
Output connector	50Ω N-type female
Output 1dB comp. point	+15dBm minimum
LO type	Internal PLL locked to TCXO
LO stability	±1ppm (–20˚C to +70˚C)
Power input	12–24V DC @ 190mA typical (via IF output cable)
Temperature range	–40˚C to +80˚C operational

Parabolic reflector, scalar feed horn and X-Band LNB



Scalar feed horn and X-Band LNB

DVB-S2 demodulator

Demodulator specifications

RF input frequency	950–2150MHz
RF input signal range	–70dBm to –20dBm
RF input connector	75Ω F-type
Symbol rates	500ksps to 110Msps
Demodulation and decoding	Automatic detection of modulation and FEC type
Outputs	RJ45 gigabit Ethernet for monitoring and control RJ45 gigabit Ethernet for data
LNB DC power feed	13.5V/18V @ 450mA, switchable, short circuit protected
Power input	100–240V AC 50–60Hz @ 35VA/25W
Form factor	19″×1U rack mount
Dimensions (W×H×D)	483×44×470mm
Weight	5.5kg
Temperature range	0˚C to 50˚C operational

Antenna sizes required to receive a reliable GK-2A UHRIT signal taking into account rain fade

Dartcom, Powdermills, Postbridge,
Yelverton, Devon, PL20 6SP, UK

Phone 01822 880253 • International +44 1822 880253
Web *www.dartcom.co.uk* • Email *sales@dartcom.co.uk*