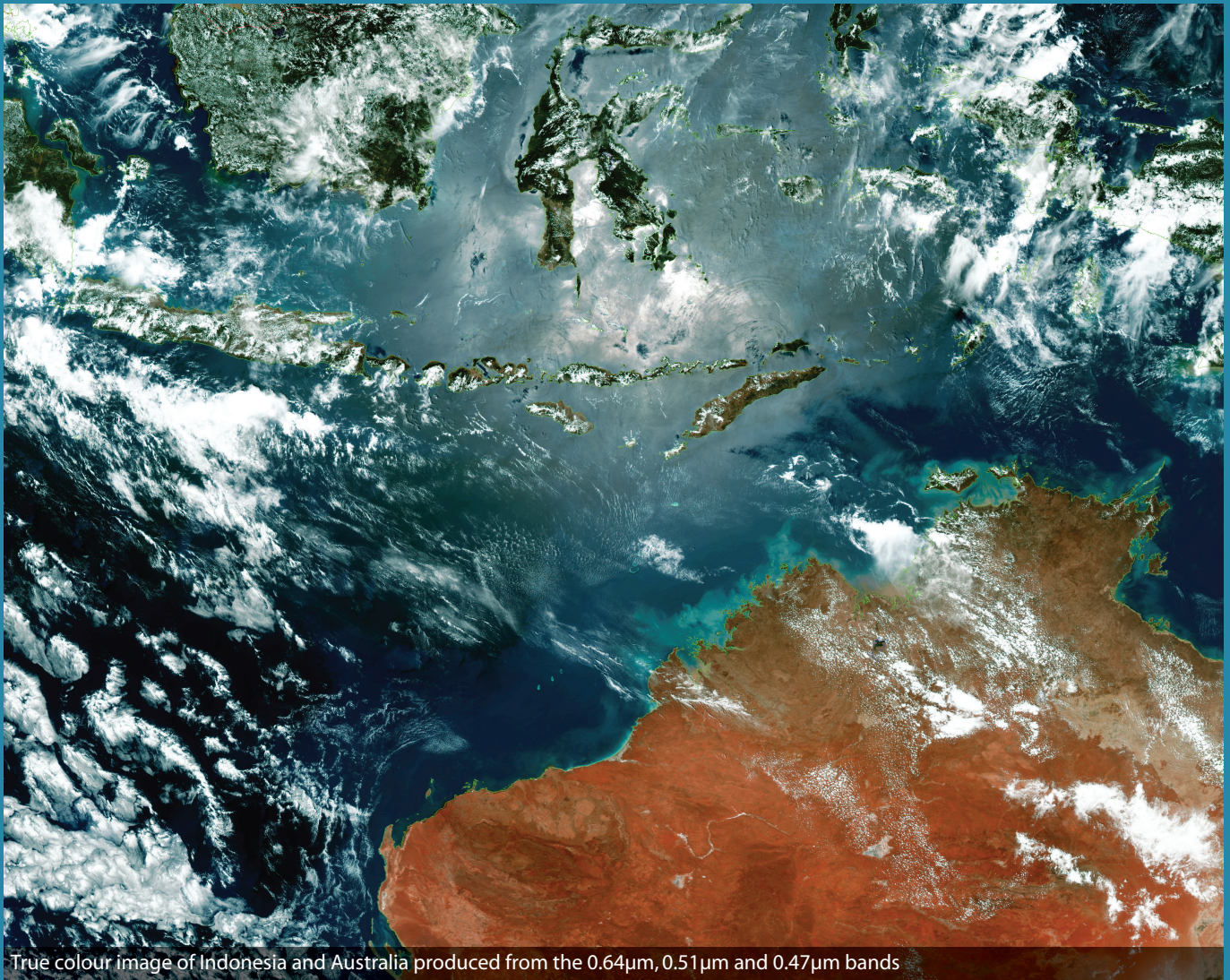


# GK-2A UHRIT System

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



True colour image of Indonesia and Australia produced from the 0.64 $\mu$ m, 0.51 $\mu$ m and 0.47 $\mu$ m bands

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

GK-2A transmits UHRIT data via a 31Mbps DVB-S2 X-Band downlink. 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 meteorological 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.

Images can be viewed and processed using the Dartcom iDAP/MacroPro software. Outputs are also available for processing software such as PCI Geomatica, ERDAS IMAGINE and ENVI/IDL, as well as standard interchange formats such as PGM and 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 Geostationary Ingester and Dartcom iDAP/MacroPro software. Supplied fully set-up and tested for a turnkey solution.

Dartcom can also provide installation and training services.

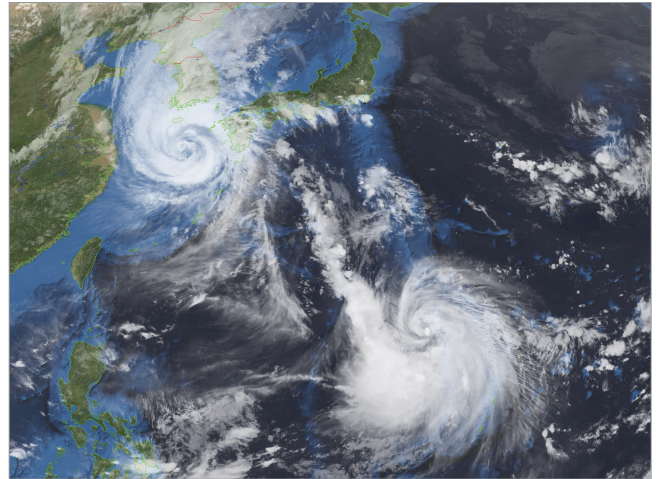
## Features

- 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 full logging and alarms.

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

## Software

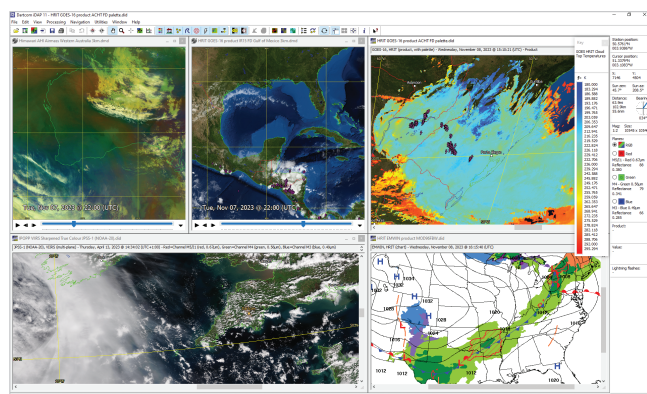
- **Dartcom Geostationary Ingester** – provides automatic ingest, archiving and output of images and other data.
- **Dartcom iDAP** – provides a wide range of image manipulation and processing facilities such as animation, enhancement, RGB products, palette products, reprojection, masking, printing, archiving and exporting to third-party file formats.
- **Dartcom MacroPro** – automates the image processing facilities provided by iDAP, with full logging and alarms.



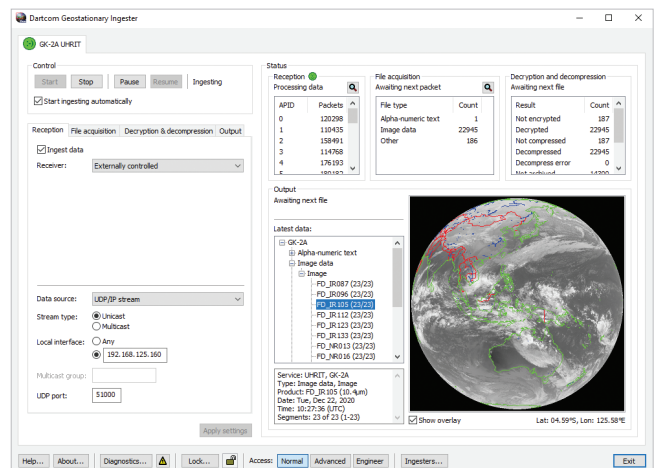
Typhoons *Maysak* and *Haishen* in September 2020, produced from the 10.5µm infra-red band with a Blue Marble mask applied using the Dartcom iDAP software

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	
Thermal infra-red	7.344µm	2km	
	8.592µm	2km	
	9.625µm	2km	
	10.403µm	2km	
	11.212µm	2km	
	12.364µm	2km	
	13.310µm	2km	



Dartcom iDAP and MacroPro software



Dartcom Geostationary 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.
- Up to 50m of Ecoflex 10 50Ω co-axial cable.

### Receiver

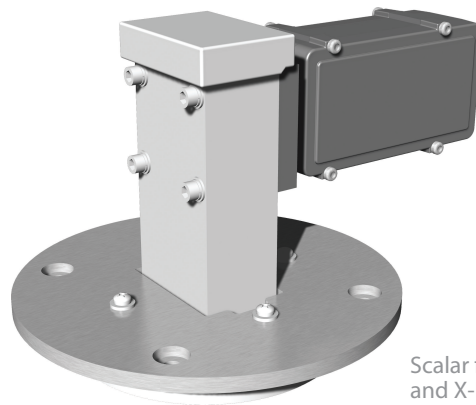
- DVB-S2 demodulator.
- Fully compliant with GK-2A downlink specifications.
- Monitoring and control via front panel or web interface.
- Data output via gigabit Ethernet.

### Ingest and visualisation PC

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



Parabolic reflector, scalar feed horn and X-Band LNB



Scalar feed horn and X-Band LNB



DVB-S2 demodulator

#### Parabolic reflector specifications

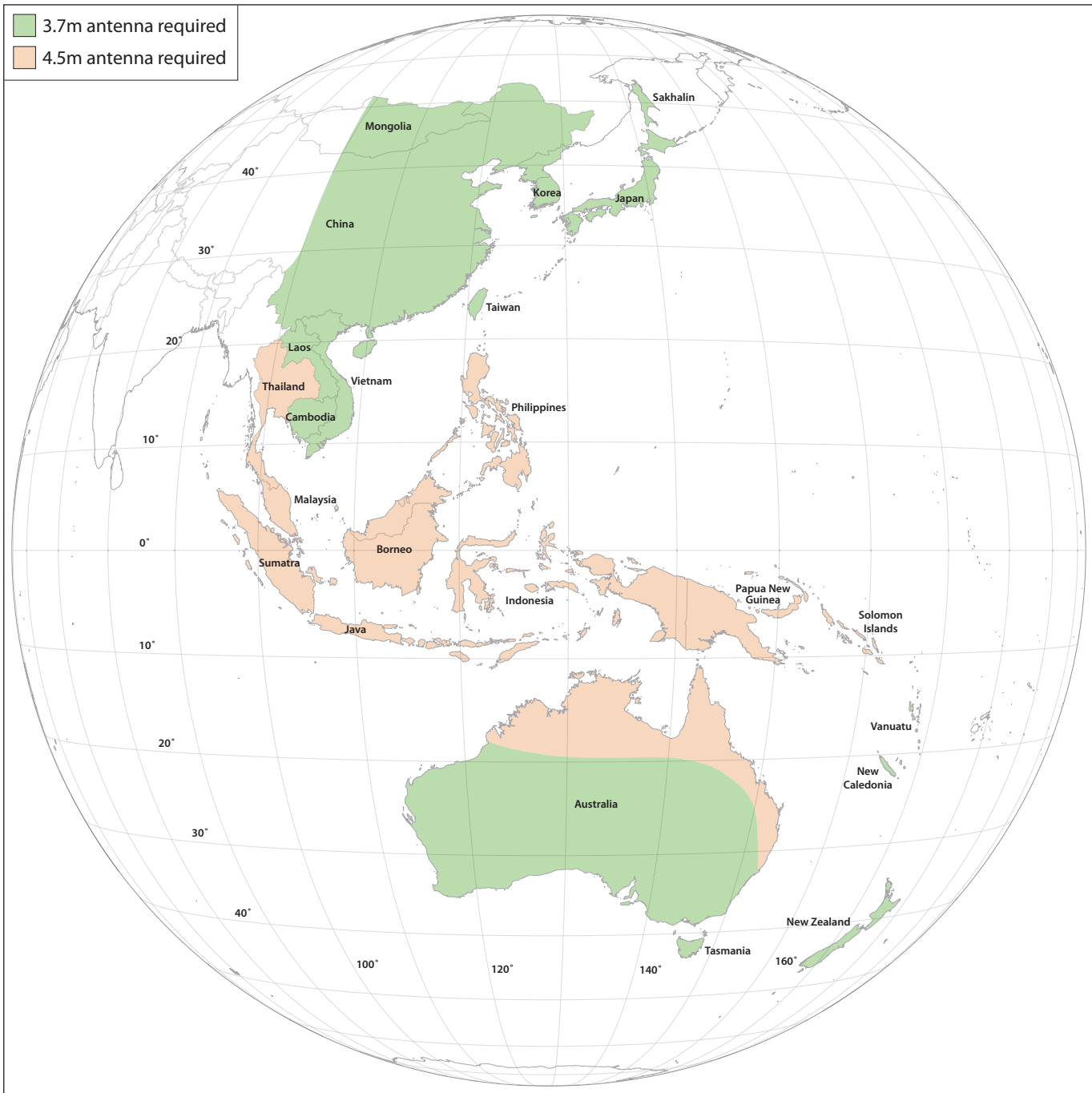
	3.7m antenna	4.5m antenna
<b>F/D ratio</b>	0.37	0.3
<b>Gain @ 8200MHz</b>	47dBi	49dBi
<b>Polarisation</b>	Circular	Circular
<b>G/T @ 5° elevation</b>	26.7dB/K	28.5dB/K
<b>Operational wind</b>	72km/h (39kt)	72km/h (39kt)
<b>Survival wind</b>	201km/h (109kt)	201km/h (109kt)

#### Scalar feed horn and X-Band LNB specifications

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

#### Demodulator specifications

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



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

