



HEAD

和德宇航

CHINA HEAD
AEROSPACE TECHNOLOGY CO

for IALA ENAV

China HEAD Aerospace Technology Co.

September, 2016

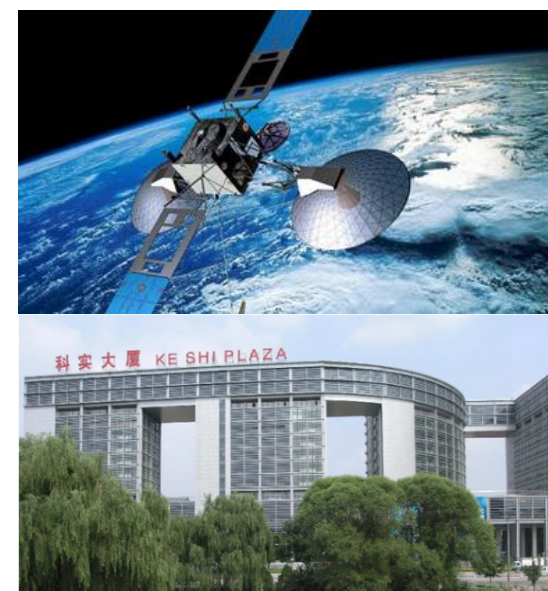
Company Profile



- HEAD Aerospace is a technical service company using small satellite and constellation to serve civilians daily life.
- Main business includes constellation operation and service; international cooperation and investment, and advanced payload R&D.

Leading small satellite technology innovation.
Devoting to satellite application in human's life.
Providing innovative small satellite technology.

Name	China HEAD Aerospace Technology Co.
Establishment	April, 2007
Location	Headquarter: Beijing Headquarter in Europe: Noordwijk, the Netherlands Subsidiaries and branches: Shanghai, Hong Kong, the Netherlands, Italy, France
Staff	62
Qualification (16 in total)	• International Astronautical Federation (IAF) member • Committee of Chinese Society of Astronautics(CSA) • National hi-tech enterprise certificate • A SpaceNed member company
Website	http:// www.head-aerospace.com

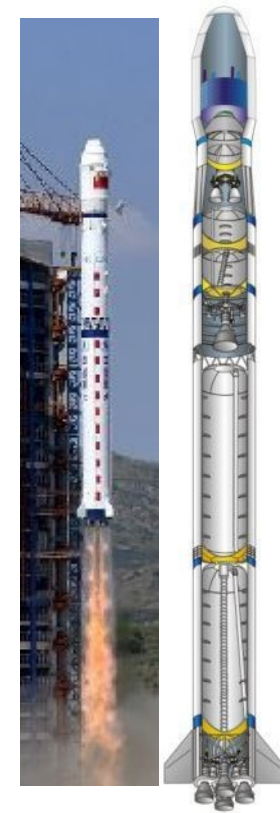
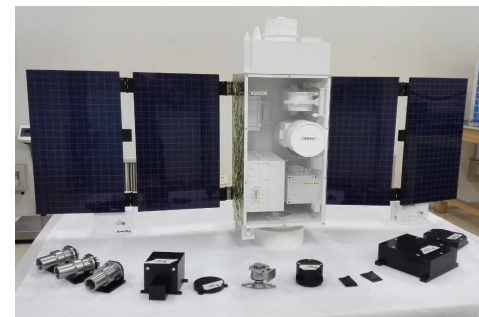
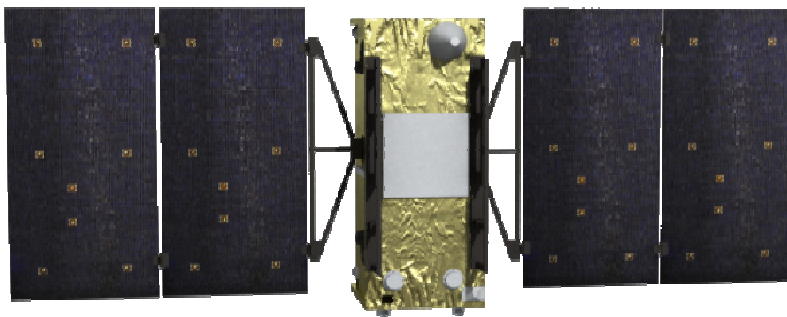


HEAD-1 – Satellite General Introduction



The 'HEAD-1' satellite based on HEAD Aerospace's strategic development plan, collecting the advantages of resources from domestic and foreign companies, developed the new generation AIS maritime micro satellite.

- Satellite Mass: 40kg
- Orbit Height: 808km
- Launcher : Long March - 4C
- Launch Time: **November, 2016**
- Manufacturer: Shanghai Institute of Satellite Engineering (SISE)



The Automatic Identification System (AIS) is mandatory by International Maritime Organization (IMO) to guarantee marine traffic safety and vessel traffic management. It consists of shipborne terminal, base-borne receiving network and satellite receiving network.

AIS uses the SOTDMA technology to transmit and receive the vessel static and dynamic data, voyage data. Identify and manage maritime safety information automatically.

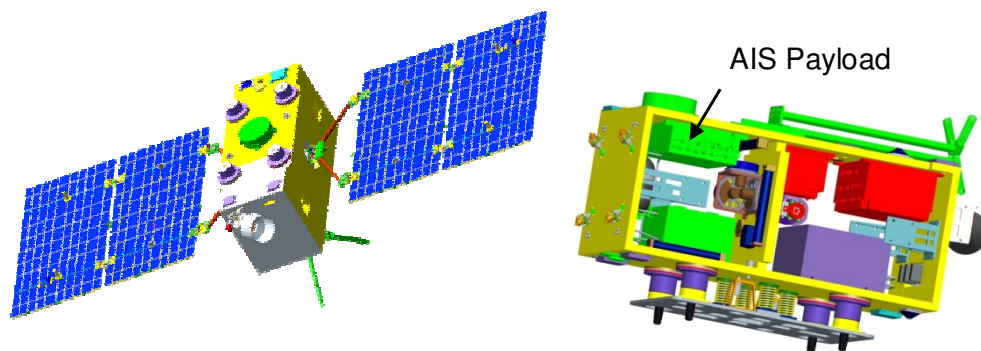


HEAD-1 – Satellite Platform



HEAD-1 satellite platform manufactured by SISE. It was based on flight heritage that was combined with a virtual, software-based design approach. This resulted in a modular and standardized platform design.

The Attitude Control is based on three-axis stabilization. Thermal management is implemented as a combination of passive and active control.



HEAD-1 Specification

Satellite Mass	40kg
Power Consumption	82W
Attitude Control	Three-axis Stabilization
Pointing Accuracy	$\leq 0.3^\circ$ (3σ)
Attitude Stability	$\leq 0.05^\circ$ (3σ)
TT&C System	USB
TM&TC Rate	8192bps
Data Transmission Rate	2Mbps
Accumulator Capacity	20Ah
Solar Array	Two Wings, 0.96m^2
Dimension	$876\text{mm}(\text{x}) \times 410\text{mm}(\text{y}) \times 436\text{mm}(\text{z})$
Lifetime	2~3 years

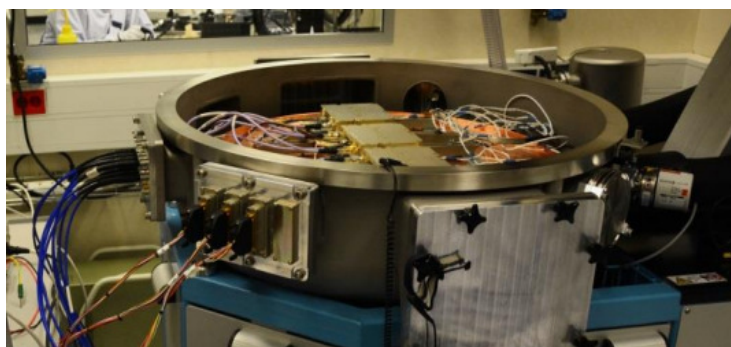
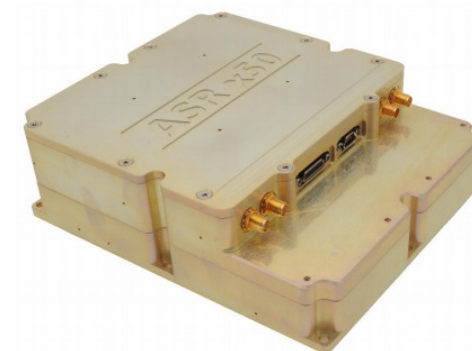
HEAD-1 – AIS Payload



Taking advantages of overseas resources, a world class AIS receiver developed by Kongsberg Group was selected as the main payload of HEAD-1.

AIS Payload Performance

Sensitivity	-126dBm@20%PER	Noise Figure	1.6dB
Dimension	51 mm x 140 mm x 168 mm	Mass	1.3kg
Consumption	4W@2 channels, 6W@4 channels	Lifetime	7.5 years
AIS Performance	Receiving 2 million messages and identifying 60 thousand vessels per 24 hours		



HEAD-1 – Ground Station



The ground station of HEAD-1 is located in Shanghai, mainly used for TT&C and receiving AIS decoder data and also for data distribution.

HEAD-1 Ground Station Parameters

Frequency	C band
Antenna Aperture	7.3m
Polarization	Left-/Right-handed circular
Main function	• Automatic capture and tracking • Data processing, real-time display, playback ability • Automatic monitoring management • Support multi-satellite management

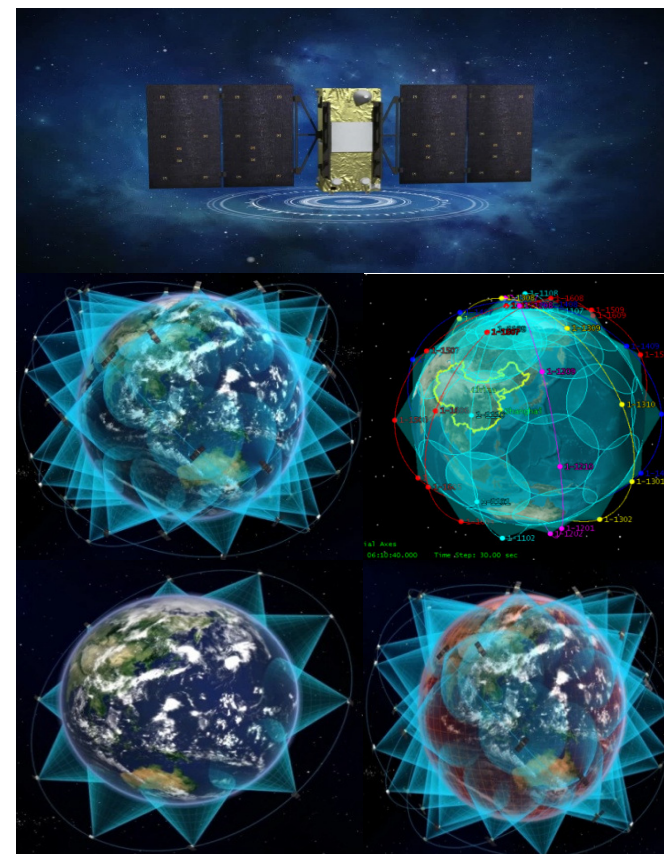


SkyWalker – Constellation General Introduction

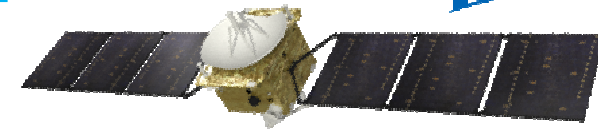


The 'SkyWalker' is a multi-functional small satellite constellation based on the successful experience of HEAD-1, taking the small satellite concept and customer requirements into consideration. It is highly suited for earth observation, maritime and data communication applications.

Constellation Name	SkyWalker
Constellation Type	500kg, 150kg, 50kg
Orbit	LEO, SSO
Payloads	AIS, DCS, Hyperspectral, SAR, Infrared
Application Areas	Maritime, Power Grid, Agriculture, Forestry, Fishery, Water Conservancy, Environment , Mining industry etc.



SkyWalker — Satellite Platform and Launching Resources



Based on mature satellite design and manufacture capability of China space

Based on mature 50kg, 200kg and 500kg satellite platform of SAST.

Global advanced technology and resource integration

Global specialists joint design.

Quick launching capability of Chinese launcher

Based on CZ-4C、CZ-2D、CZ-6、QZ, Spaceship etc.

Guaranteed Turnkey Project

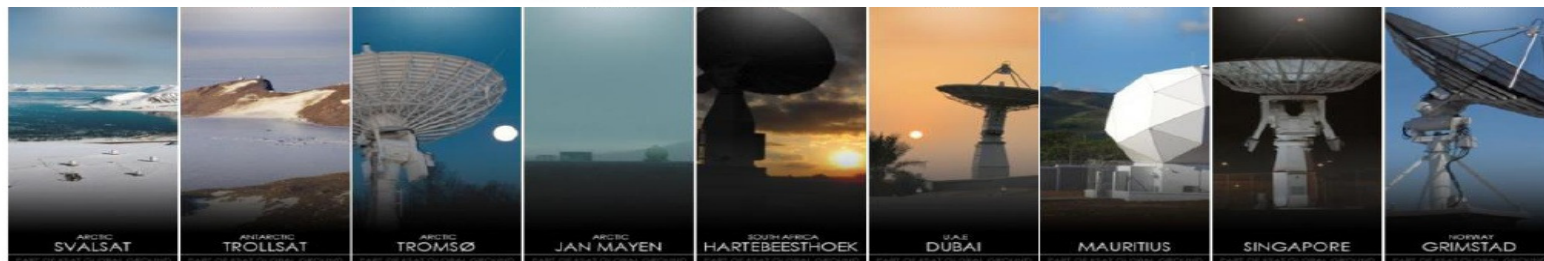
- Satellite constellation with cost-effective, high-performance
- Piggybacking launch opportunities
- International cooperation
- Support by preferential policy



SkyWalker — Global Ground Station Network



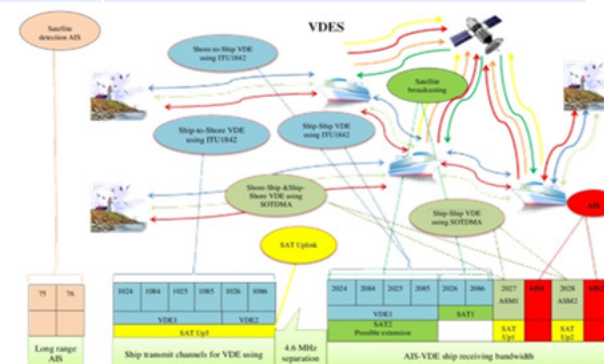
Cooperating with world famous ground station companies, realizing the global coverage (including polar region) and near real-time transmission.



VDES: VHF Data Exchange System

VDES consists of AIS, ASM and VDE. AIS reserve the original function, ASM and VDE have higher communication rate and can provide short messages, email, weather information and vessel location report services.

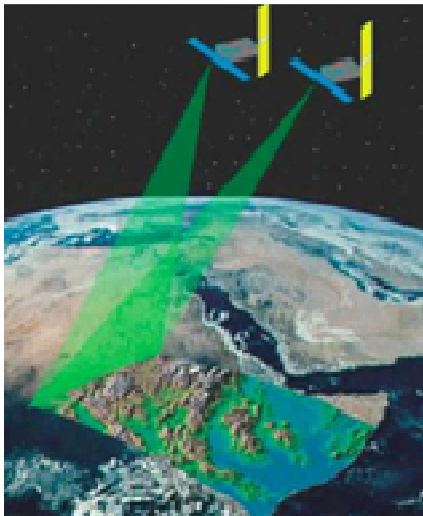
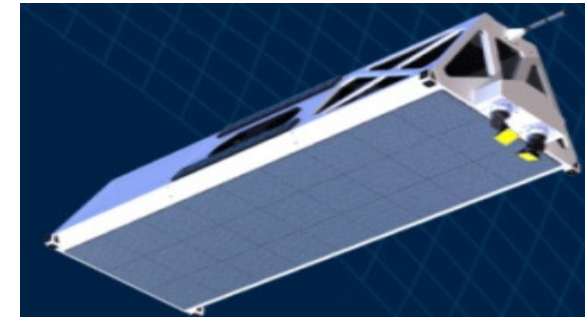
Performance	AIS	ASM	VDE
Communication Rate	9.6kbps	28kbps	300kbps
Application Scenarios	- Vessel Information - Safety Information - Rescue Information	- Weather Information - Rescue Information - Short Messages	- Email - Meteorogram - Vessel Location Report - Safety Related Information



SkyWalker – SAR Payload



HEAD owns the know-how and mature technical proposal in low cost small satellite based SAR system. A high performance, quick response small satellite SAR constellation can provide high quality data and services to various industries .



System	Multi-static FMCW SAR
Frequency	X band
Resolution	1m~10m
Work Mode	StripMap, spotlight and scan
Function	SAR、 InSAR、 GMTI
Antenna	Waveguide slot phase array
Mass	< 300kg

Constellation Applications – AIS/VDES



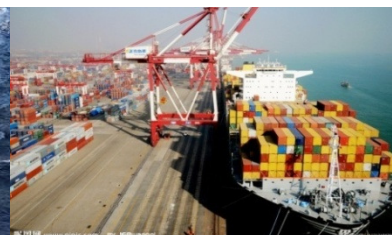
Based on the AIS business operation of HEAD-1, a 24 AIS satellites constitute the network and provide the near real-time coverage to global ocean and main river course. Expanding the '21 Century Maritime Silk Road' and strengthening the AIS maritime and financial application.



Vessel Navigation



Accident Judgment



Port Management



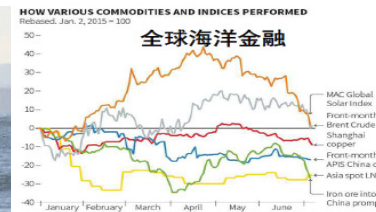
Route Planning



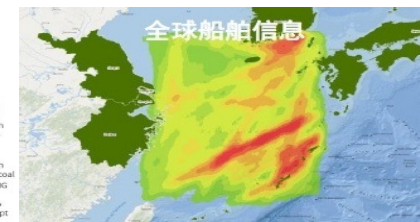
No Man's Land Navigation



Emergency Rescue



Global Ocean Finance

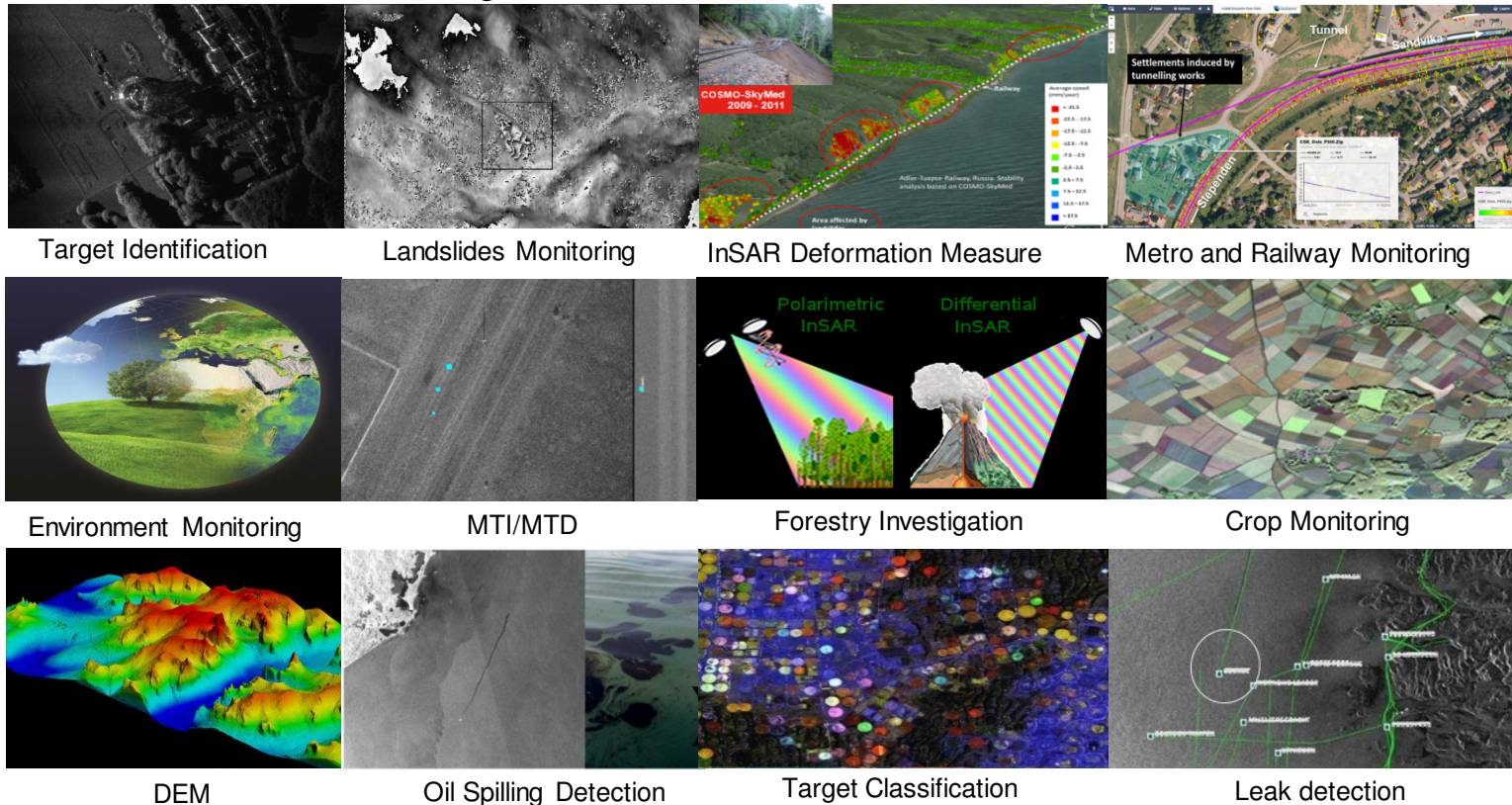


Maritime Information Analysis

Constellation Applications – SAR



Space borne SAR can be widely used in ocean monitoring, disaster prevention, water resources, meteorology, agriculture and environment monitoring etc.



Contacting with the maritime, ports and fishery offices of countries located along the One Belt and One Road ('21 Century Maritime Silk Road'.) and expanding global maritime markets for AIS/VDES applications.

Serve for global partners!





HEAD Aerospace

Let space enter your life!

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