

# Search and Rescue Payload Based on BeiDou System: Plan & Advancement

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# Contents

1

**Background**

2

**Plan of the SAR Payload Based on BDS**

3

**Main Technical Characteristics**

4

**Tasks in Near Future**



**1**

# Background of the SAR Payload

# SAR Development Ideas of China

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## ICG11

- BeiDou System SAR Application and Future Conception

## ICG12

- Search and Rescue Payload Based on BeiDou System : Plan & Advancement

## Development Ideas

- SAR based on BeiDou short message
- SAR based on MEOSAR

# COSPAS-SARSAT Programme

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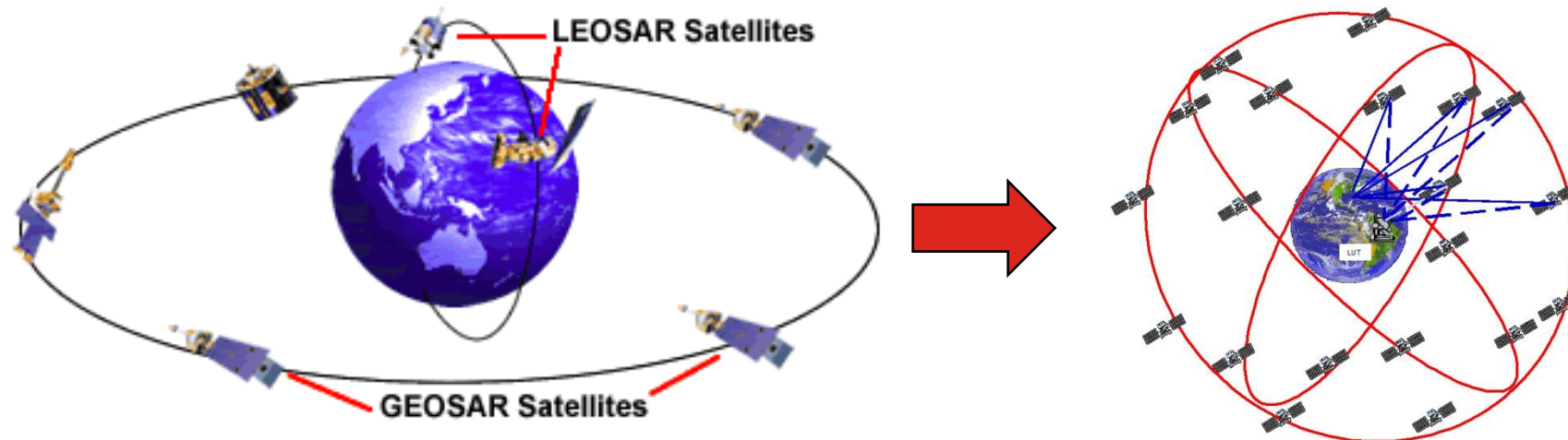
The International COSPAS-SARSAT Programme is a treaty-based, nonprofit, intergovernmental, humanitarian cooperative of 44 nations and agencies dedicated to detecting and locating radio beacons activated by persons, aircraft or vessels in distress, and forwarding this alert information to authorities that can take action for rescue. It includes LEOSAR, GEOSAR and MEOSAR in future.



# Global MEOSAR

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Since 2000, GNSS such as GPS\GLONASS\ GALILEO initiated to provide SAR augmentation services, which was supported by the COSPAS-SARSAT Programme. The global MEOSAR has a better position accuracy, global coverage and much shorter latency time. According to the schedule, the implementation of MEOSAR is on going, some tests have been finished .



# SAR Ground Segment in China

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In China, the LEOSAR ground segment including the terminal station and Mission Control Center is on operation. China is the Ground Segment Providers and provide search and rescue service in Chinese zone as well as the distress data exchange service for the west pacific region. According to the plan, the ground segment of MEOSAR in China is under upgrading.



**2**

## Plan of the SAR Payload based on BDS



# Objectives

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BDS will add the SAR payload to provide the SAR service in near future. The BDS as well as other GNSS ( SAR/GPS、 SAR/GALILEO 、 SAR/GLONASS ) will become the key player in the MEOSAR system to provide the global distress services.

# Plan of the BDS SAR Payload

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BDS will add the SAR payload on 5-6 satellites during 2018-2020, and the initial launch is in year 2018.

BDS chooses the Walker 24/3/1 constellation and orbit altitude is 21528km with inclination 55 degree. The first and second BDS satellite with SAR payload will work on the third orbit for the 3rd and 5th phase of the satellite.

# Service Ability

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BDS MEOSAR is part of the COSPAS-SARSAT Programme to enhance the full-function operation.

After BDS joining the SAR constellation, user can use more visible MEOSAR satellites at any location, and the digital distress beacons can provide higher position accuracy to increase the SAR service around the globe.

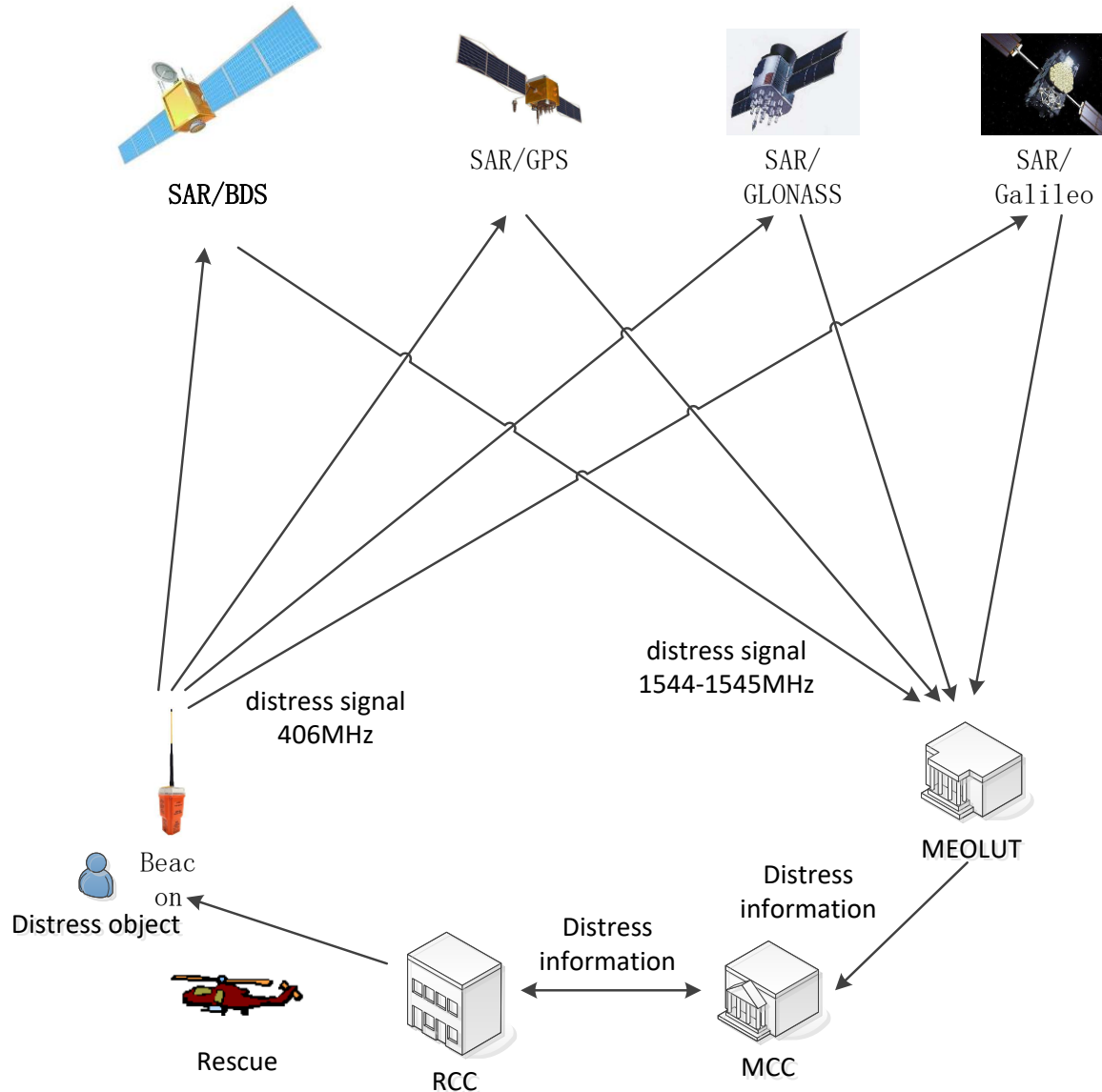


# 3

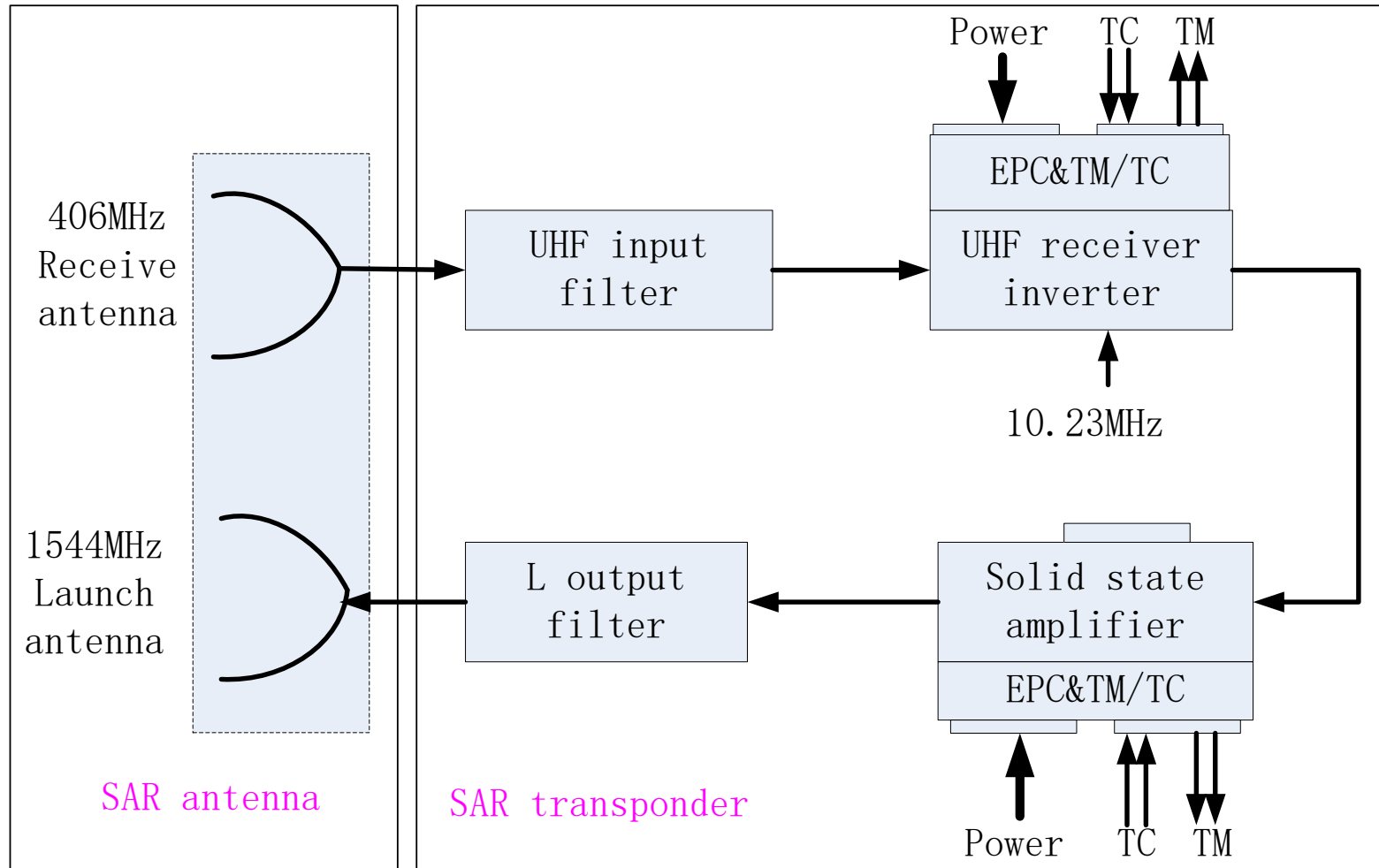
## Main Technical Characteristics

# Comprehensive Plan

The system includes: SAR Payload, ground segment processing system and digital distress beacons. BDS SAR Payload includes SAR transponders and antenna to receive and transfer the distress signal; ground segment including LUT, MCC and RCC can receive the information and dispatch the rescue vessels; distress beacons include vessel beacons, airborne beacons as well as personal beacons.



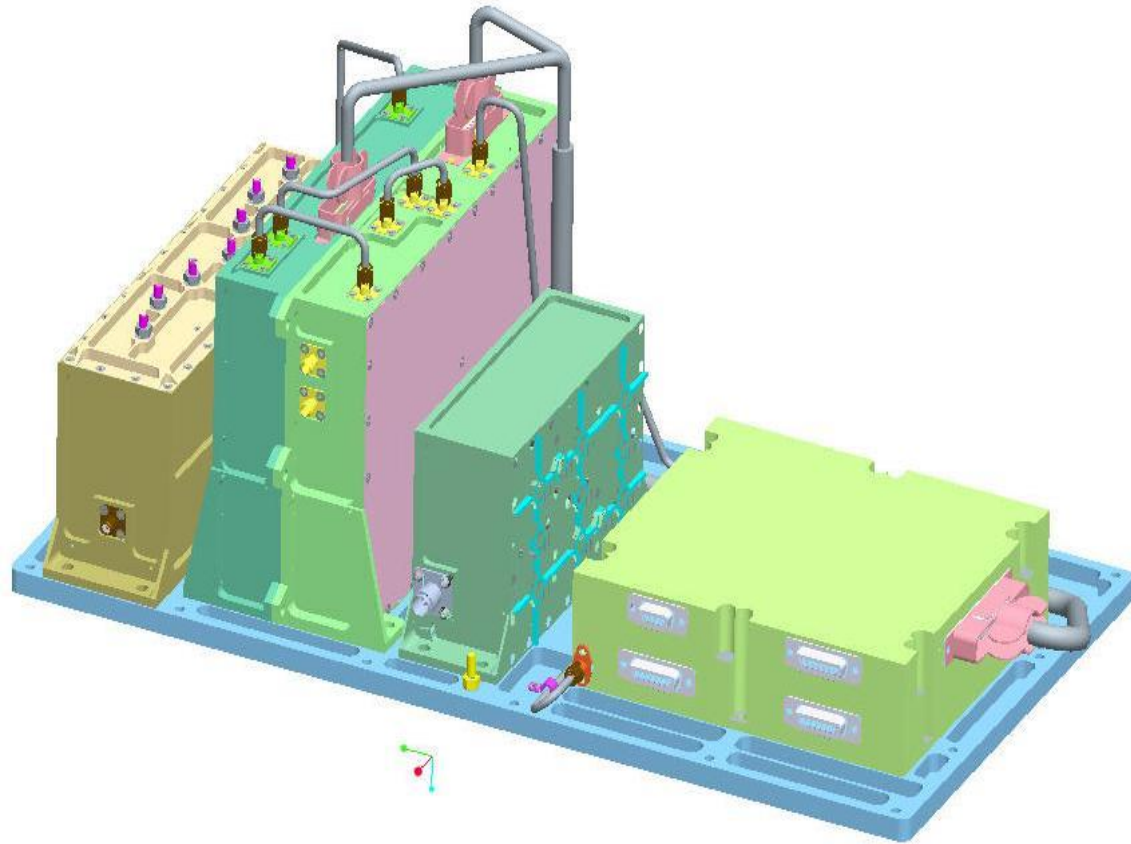
# Specification for the Space Segment



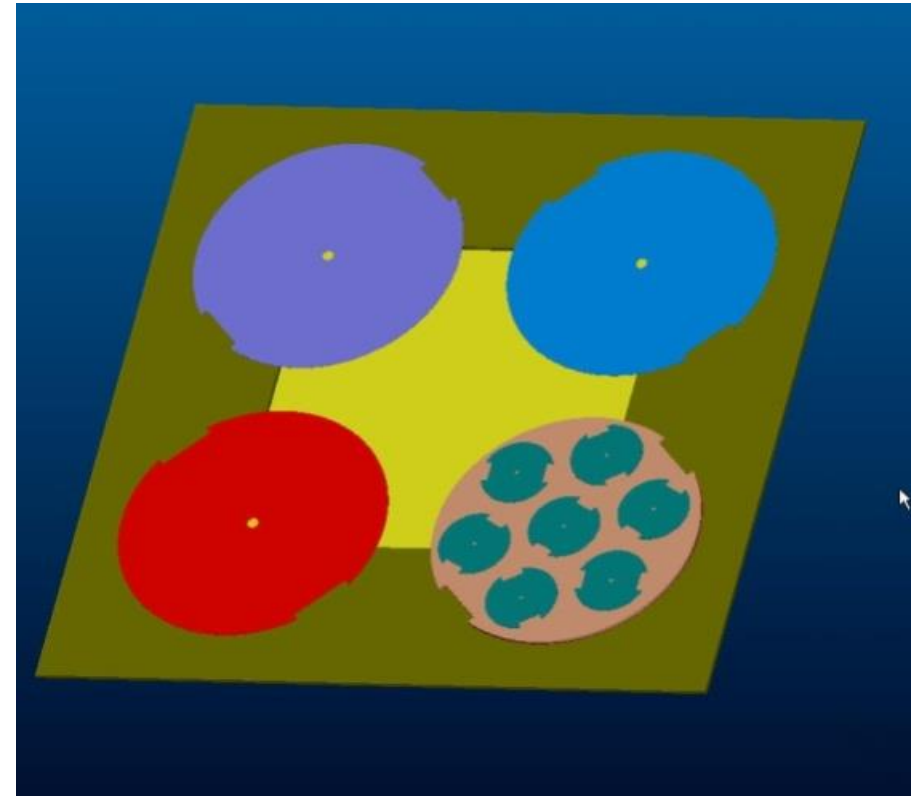
SAR payload has two functions: 1) transfer the distress signal by receiving, filtering and transmitting the signal; 2) support the localization of the distress user, which requires a stable and accurate frequency conversion, accurate satellite orbit and time synchronization accuracy. Currently, the SAR payload is being developed and tested.

# Specification for the Space Segment

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SAR Transponder



SAR Antenna

# Specification for the Ground Segment

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## MEOLUT

Compatible with BDS SAR payload as well as other MEOSAR payload, MEOLUT can receive the load downlink with L/S distress signal, moreover, it has the capabilities to receive, process and position of the global distress beacon signal, which will be sent to CNMCC.

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## CNMCC

Complete the receiving and processing of distress data. It sends distress alert messages to China Maritime Search and Rescue Center and also to the northwest pacific data nodes according to data sharing plan.

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## Tasks in Near Future

# Join the COSPAS-SARSAT Programme

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According to the requirements, more collaboration and coordination is necessary in the framework of COSPAS-SARSAT, e.g. downlink frequency should be defined to support the global service.

In Oct., 2017 during the 31th meeting, COSPAS-SARSAT agree the BDS SAR payload to join the MEOSAR test plan.

# Provide Global Distress Service

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According to the requirements of COSPAS-SARSAT, BDS commit to join the MEOSAR to add the SAR payload and to finish the ground segment construction. At the same time, BDS will promote the MEOSAR standardization process to contribute to the global SAR services.

**Thank you!**