



16th Meeting of the International Committee on
Global Navigation Satellite Systems



BDS Contribution To Search And Rescue

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BDS/SAR
Development

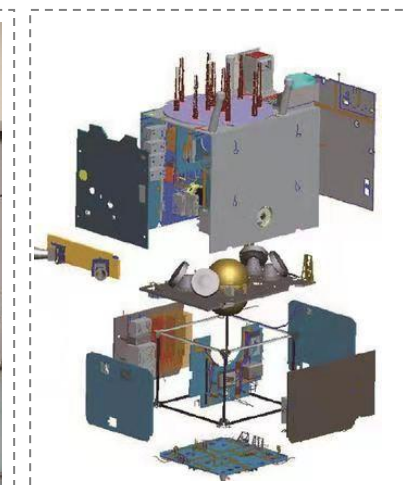
01

Progress of integrating BDS into C/S MEOSAR



The BDS MEOSAR system provides search and rescue (SAR) services which conforms to the COSPAS-SARSAT requirements, and has the BDS return link service (RLS) via BDS B2b signal.

Service type	Central Frequency	Constellation
Forward link	Uplink 406.05 MHz	6 MEO
	Downlink 1544.21 MHz	
Return link	B2b 1207.14 MHz	24 MEO + 3 IGSO



Progress of integrating BDS into C/S MEOSAR



2017 Submit application to COSPAS-SARSAT on JC 31

Declare to COSPAS-SARSAT that China is willing to launch 5 to 6 BeiDou satellites with SAR payloads.

2018 BDS is added in MEOSAR Implementation Plan

The 59th session of Council of COSPAS-SARSAT reviewed and approved the MEOSAR Implementation Plan.

2018 Completed BDS-GALILEO frequency coordination

China officially announced to use 1544.21MHz for BDS MEOSAR payloads.

2019 Submit PROPOSED BDS AMENDMENTS on JC 33

Submit PROPOSED BDS AMENDMENTS TO DOCUMENT C/S T.016, T.017, T.019 (JC-33/04/04, JC-33/04/05 and JC-33/05/05). e.g C/S T.016 "Description of the 406 MHz Payloads Used in the COSPAS-SARSAT MEOSAR System".

2020 Submit DESCRIPTION OF RLS/BDS INFORMATION on JC 34

C/S T.001, C/S T.018, C/S R.012 (JC-34/Inf.36, JC-34/Inf.37) . e.g C/S T.001 "Specification for Cospas-Sarsat 406 MHz Distress Beacons"

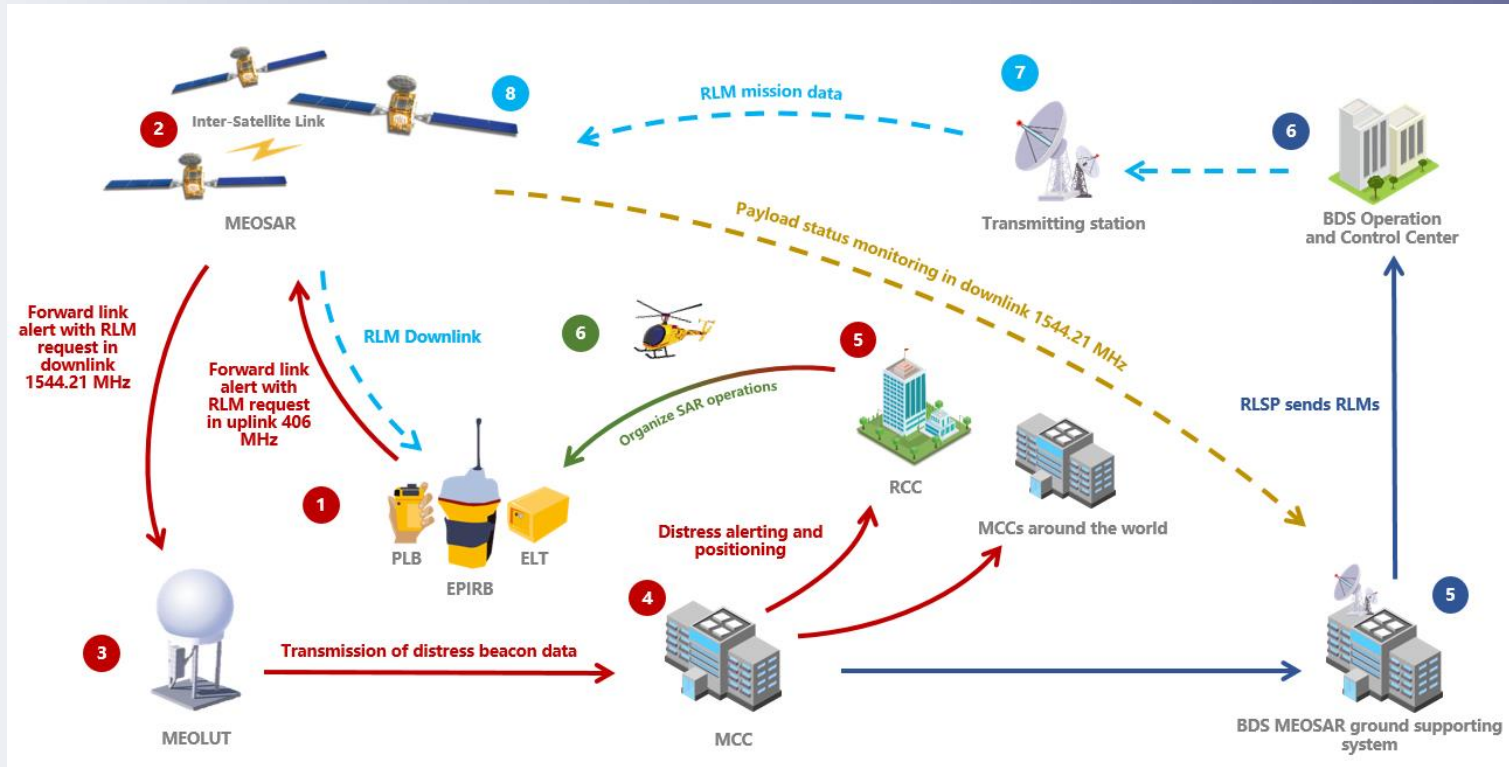
2021 SAR REPEATER COMMISSIONING REPORT on EWG-5C

BDS SATELLITE 632, 633, 643, 644, 645, 646 SAR REPEATER COMMISSIONING REPORT

Progress of integrating BDS into C/S MEOSAR



2022



Submit PROPOSED BDS-RELATED AMENDMENTS TO DOCUMENT C/S T.007, T.014, T.016, T.021, etc.

Commissioning reports of SAR/BDS satellites M13, M14, M21, M22, M23 and M24 were complete and no further information was required.

Continuous payload monitoring.

DOI (Declaration of Intent between C/S and China, on-going)

SAR/BDS Space Segment Status



DOI

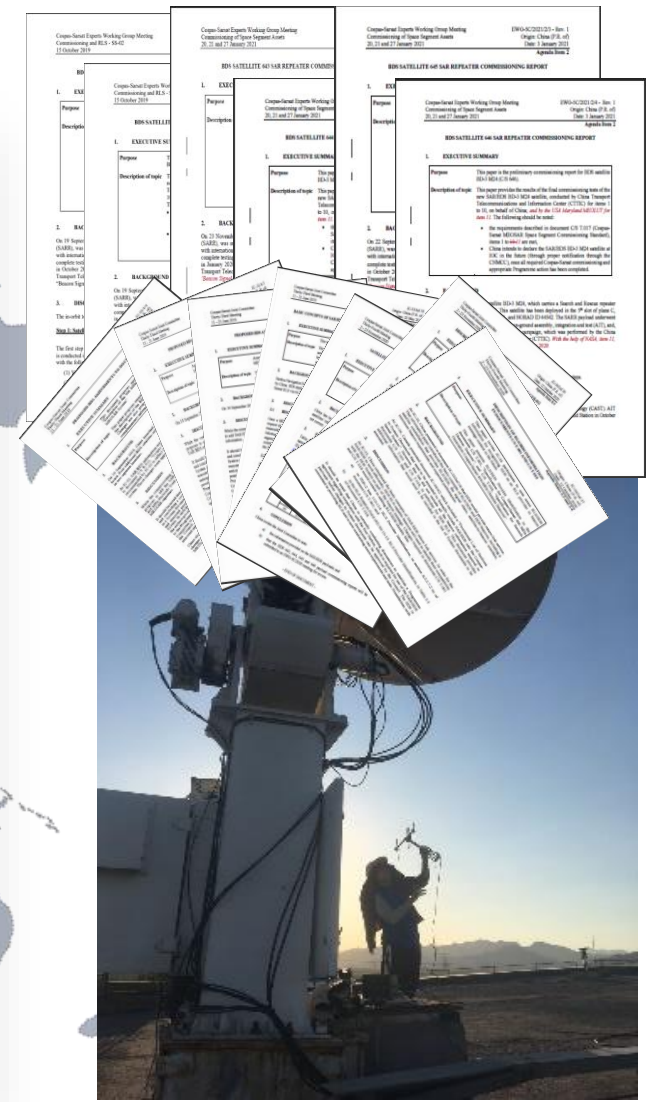
A framework policy document, in the form of a Declaration of Intent (DOI) between the Parties and China, was necessary to allow the integration of the SAR/BDS payloads into the Cospas-Sarsat System, that the review of the framework document was moving forward among the Parties.

Successful completion of the review of the SAR/BDS commissioning reports

a) SAR payloads onboard SAR/BDS satellites M13, M14, M21, M22, M23 and M24 had been appropriately assessed against document C/S T.017 (MEOSAR payload commissioning standard) and in accordance with the SAR payload descriptions provided at Annex 23 of the JC-33 Report;

b) commissioning reports of SAR/BDS satellites M13, M14, M21, M22, M23 were complete and no further information was required.

—EWG-5C/2021





BDS Return Link
Service
Development

02

RLM inter-operation

copy or write your text and paste it here

Type 1 RLM:

- Test (type F)
- Acknowledge

Type 2 RLM:

- Remote on
- Remote off
- Etc.

Type 3 RLM:

- Plain text (UTF-8)

- **Inter-operable** with IEC 61162-1:2024 RLM sentence
- **Encourage** other GNSS to work together for RLM inter-operation
- To conduct RLS/BDS cross country test





GNSS Based
Emergency
Broadcasting
Service
consideration

03

Service Design

- MSI with coded scheme
- MSI with plain text
- Galileo Scheme
- QZSS Scheme
- NavIC Scheme
- BDS is considering signal properties and signal availability to design its own signal type.

Broadcasting service inter-operation

- We invite other GNSS provider to support **message inter-operation and other system re-broadcast**
- We also recommend all providers to have an unified name, such as **GNSS Based Emergency Broadcasting Service**



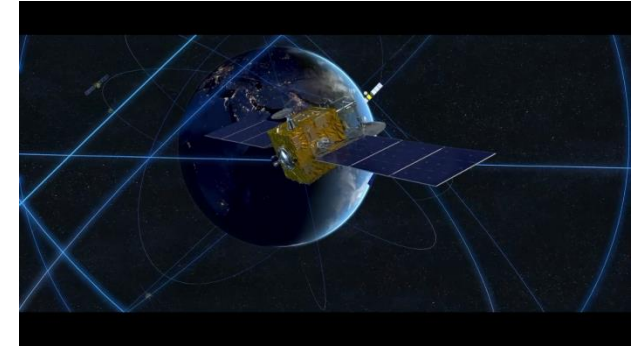
Next Gen
SAR system
consideration

04

NG SAR Plan

For next generation BDS SAR system design consideration

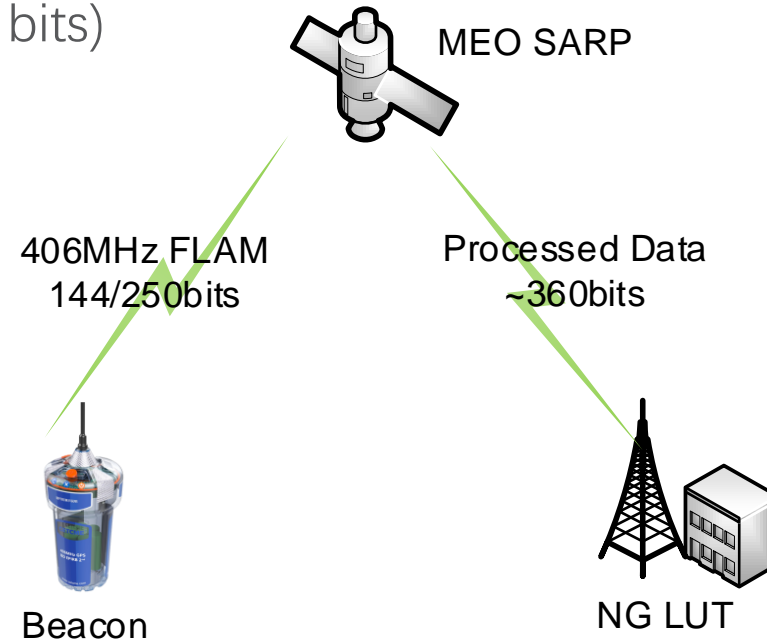
- Continue with current SAR repeater
 - C/S T.016
 - 1544.21MHz
- May shift to on-board SAR processor
 - Support SGB
 - Support omni-LUT



Single processed FLAM Content

- 406MHz FLAM original data (144 bits or 250 bits)
- FLAM information (~10 bits)
- Time of Arrival (~20 bits)
- Frequency of Arrival (~20 bits)
- CRC(~50 bits)

Total ~ 360 bits



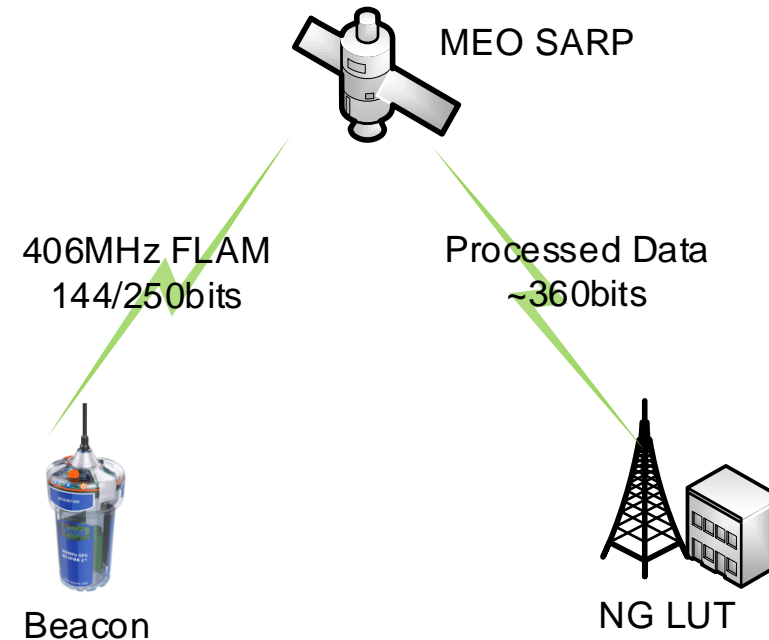
Downlink Modulation Method

e.g.

- AFSK
- GMSK

Baud-rate	Max downlink processed data per second
1200 baud	~3.3
4800 baud	~13.3
9600 baud	~26.6

Scheme should be carefully designed for inter-operation.





Thank you!