

SAR/Galileo

Forward Link and Return Link Services

Antonio ROLLA, European Commission

User Consultation Platform, 1 December 2020

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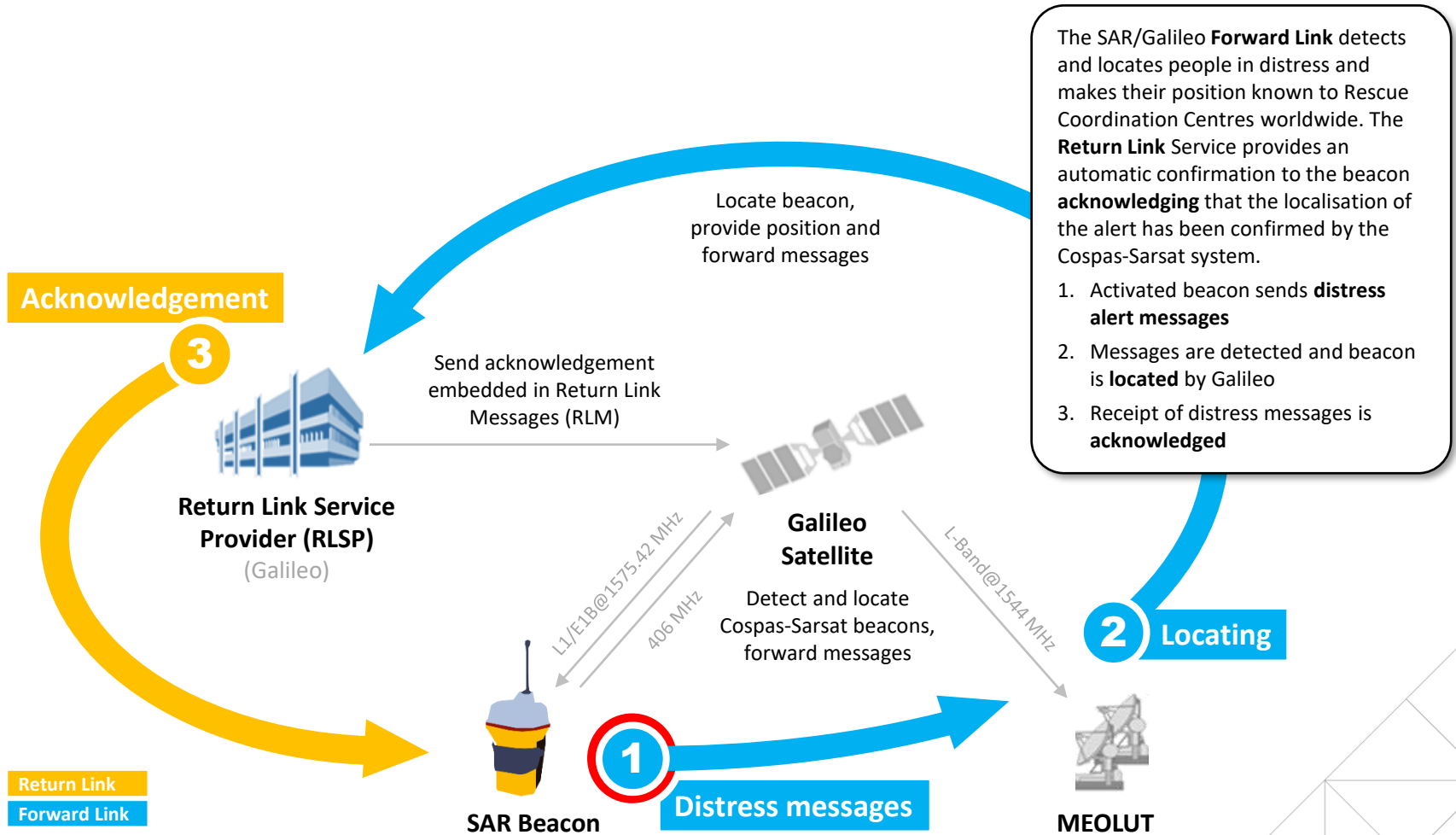


EU Space Programme



SAR/Galileo Forward Link and Return Link (FL/RL)

High-Level Concept



SAR – Search and Rescue,
MEOLUT – Medium Earth Orbit Local User Terminal

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SAR/Galileo

Remote Beacon Activation via Galileo RLS

Manuel Lopez, Helmut Spitzl, European GNSS Agency
User Consultation Platform, 1 December 2020

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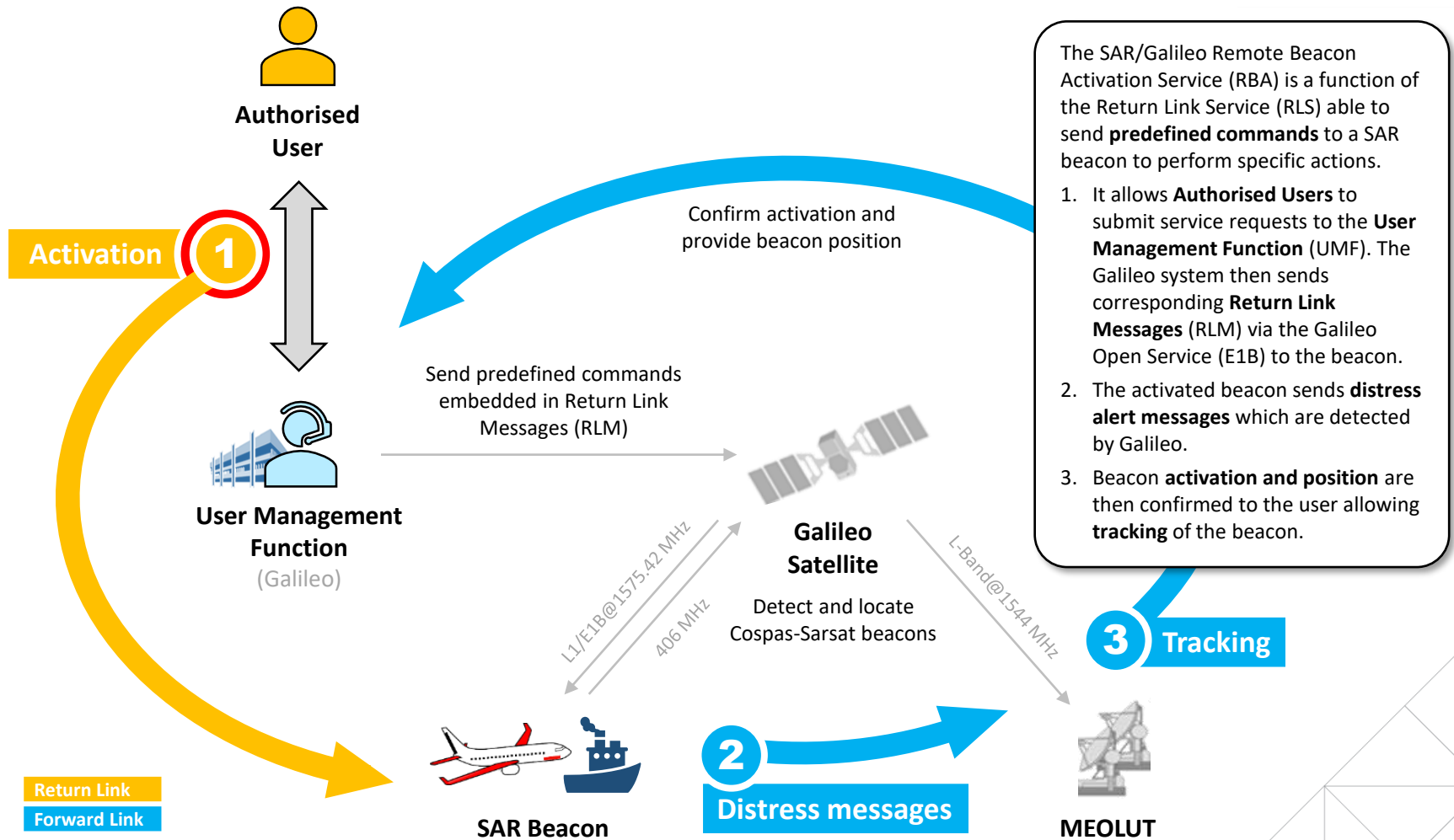


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SAR/Galileo Remote Beacon Activation (RBA)

High-Level Concept



The SAR/Galileo Remote Beacon Activation Service (RBA) is a function of the Return Link Service (RLS) able to send **predefined commands** to a SAR beacon to perform specific actions.

1. It allows **Authorized Users** to submit service requests to the **User Management Function (UMF)**. The Galileo system then sends corresponding **Return Link Messages (RLM)** via the Galileo Open Service (E1B) to the beacon.
2. The activated beacon sends **distress alert messages** which are detected by Galileo.
3. Beacon **activation and position** are then confirmed to the user allowing **tracking** of the beacon.

SAR – Search and Rescue,
MEOLUT – Medium Earth Orbit Local User Terminal

SAR/Galileo Remote Beacon Activation (RBA)

Only **Authorised Users** can access the service



Authorised User

1. Conclude **User Agreement** to become Authorised User
2. **Register** in user database (depending on user profile):
 - Point(s) of Contact
 - Aircraft/vessel IDs and beacon IDs
3. Ensure information is **up-to-date**

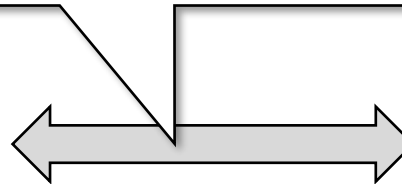
User Agreement

- Description of service
- Conditions of use
- Obligations of the parties
 - Requirements for initial and recurrent **training**
 - Information on user **profiles** and permissions
 - Allowed **frequency** of service requests
 - Allowed number of **simultaneously activated** beacons
 - Requirements for **tests**
- Consequences in case of inappropriate use

Service Provider

1. Manage user **authorisation** and assign user **profiles**
2. Provide **authentication**
3. Host **database**
4. Provide **user interface** that limits human errors
5. **Validate** service request
6. **Send** commands to beacon
7. Provide **acknowledgements** and feedback to User
8. Maintain service **history**

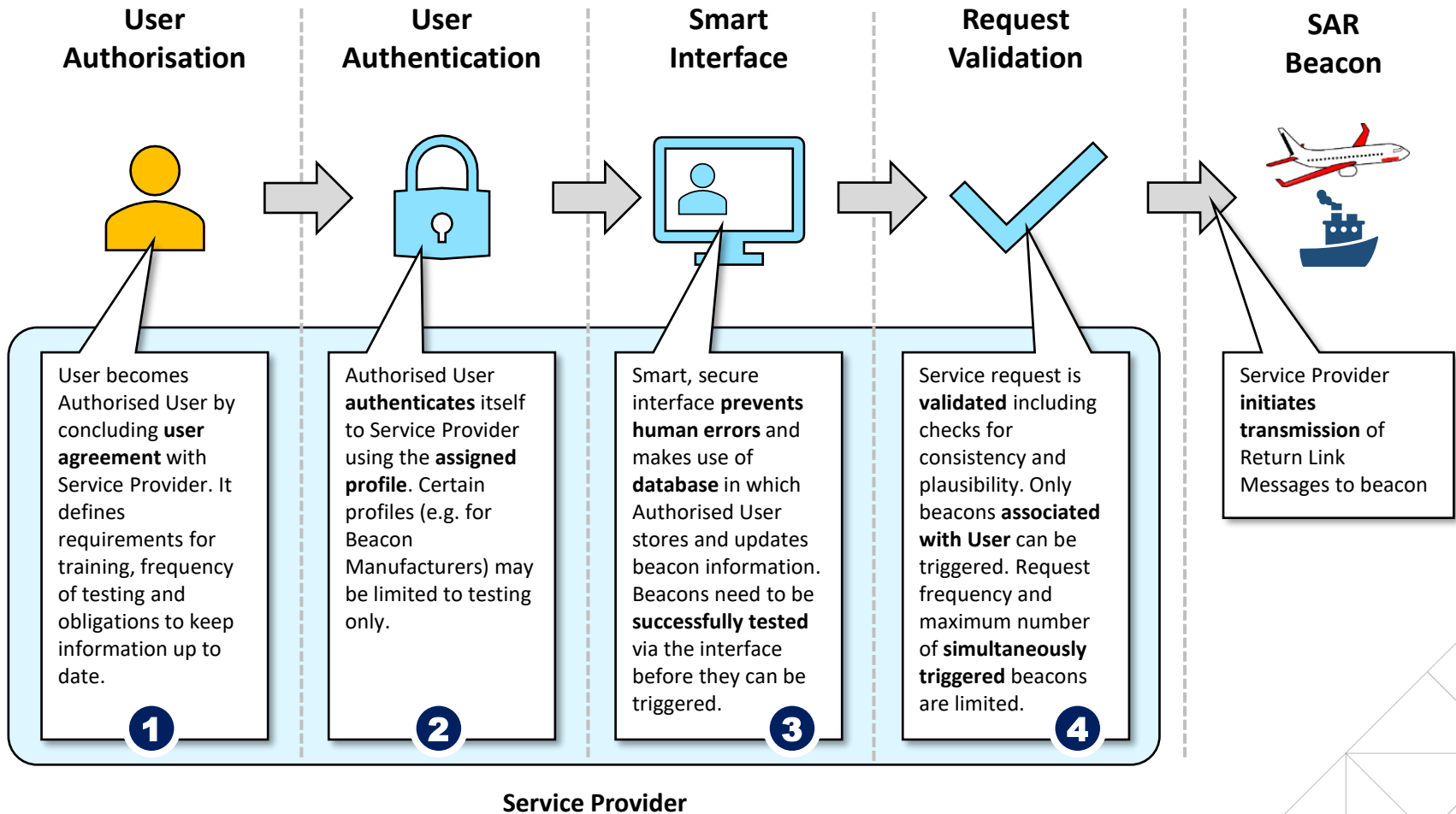
User Profile	Aviation	Maritime
Activation/Deactivation	Aircraft Operator	MRCC connected to MCC
Registration	Aircraft Operator	Vessel Owner
SAR Beacon	ELT(DT)	EPIRB



SAR – Search and Rescue, MRCC – Maritime Rescue Coordination Centre, MCC – Mission Control Centre, ELT(DT) – Emergency Locator Transmitter (Distress Tracking), EPIRB – Emergency Position-Indicating Radio Beacon

SAR/Galileo Remote Beacon Activation (RBA)

Robust measures are implemented throughout the service

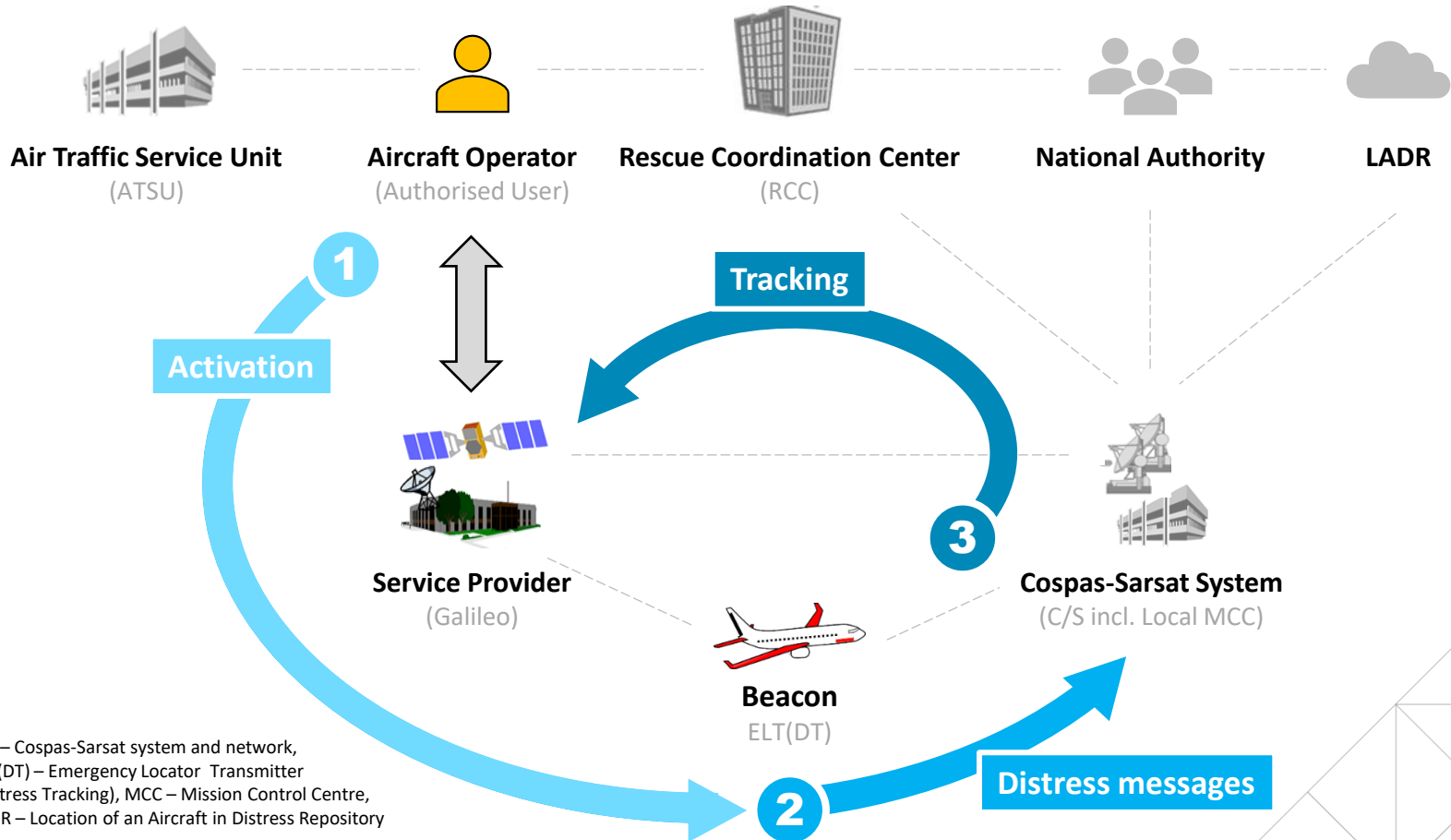


SAR/Galileo Remote Beacon Activation (RBA)

High-level Concept for Aviation



- 1 Authorised User (**Aircraft Operator**) requests **Remote Activation**
- 2 Beacon transmits **Distress Alert Messages**
- 3 Service Provider **confirms** activation and starts **tracking**



C/S – Cospas-Sarsat system and network,
ELT(DT) – Emergency Locator Transmitter
(Distress Tracking), MCC – Mission Control Centre,
LADR – Location of an Aircraft in Distress Repository

SAR/Galileo Remote Beacon Activation (RBA)

High-level Concept **for Maritime** (under study)



For the Remote Activation of **EPIRB** the **Authorised User** being investigated is the **MRCC connected to MCC**. The process is as follows:

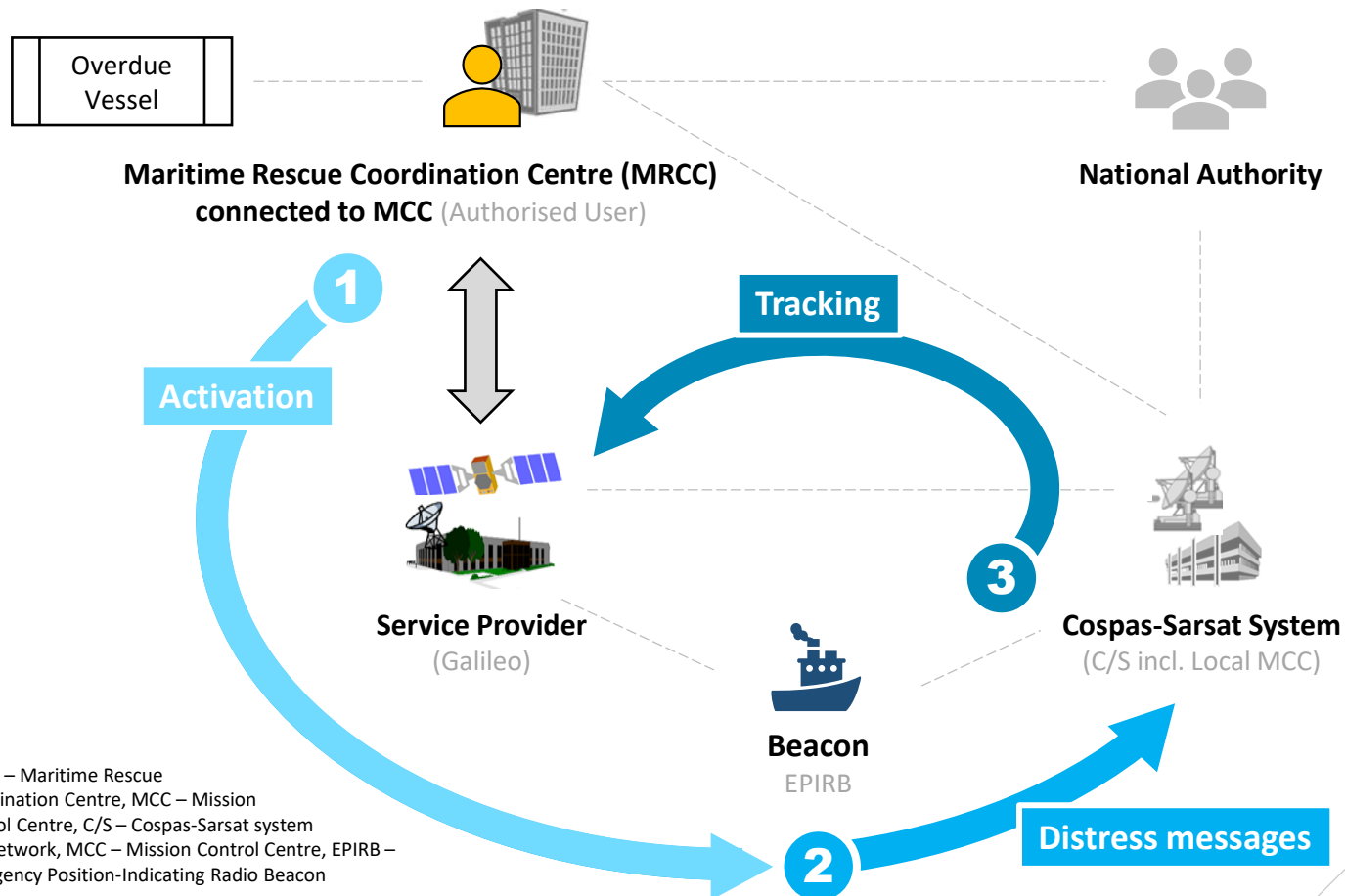
1. Using established means (e.g. IAMSAR Manual), the **MRCC connected to MCC** is informed of an **overdue vessel** (*Awareness Stage*).
2. MRCC starts the **escalation process** passing through the different emergency phases: *Uncertainty Phase, Alert Phase, Distress Phase*.
3. Once the MRCC declares the *Distress Phase*, the MRCC verifies in the database if the EPIRB can be remotely activated and if so, the **MRCC connected to MCC requests its remote activation** to Galileo.
 - Note: The registration by a user of a remote activation enabled beacon implies the acceptance of the terms of use, including the possibility of an MRCC activating the beacon remotely.
4. Galileo activates the beacon by means of the **Return Link**.
5. The beacon is activated and starts transmission.
6. **C/S ground infrastructure** locates the EPIRB and sends its position to the MRCC **via the MCC**.
7. The MRCC continues coordinating the rescue efforts.
8. At the end of the rescue process, the MRCC requests **remote deactivation** of the EPIRB to Galileo.

SAR/Galileo Remote Beacon Activation (RBA)

High-level Concept **for Maritime** (under study)



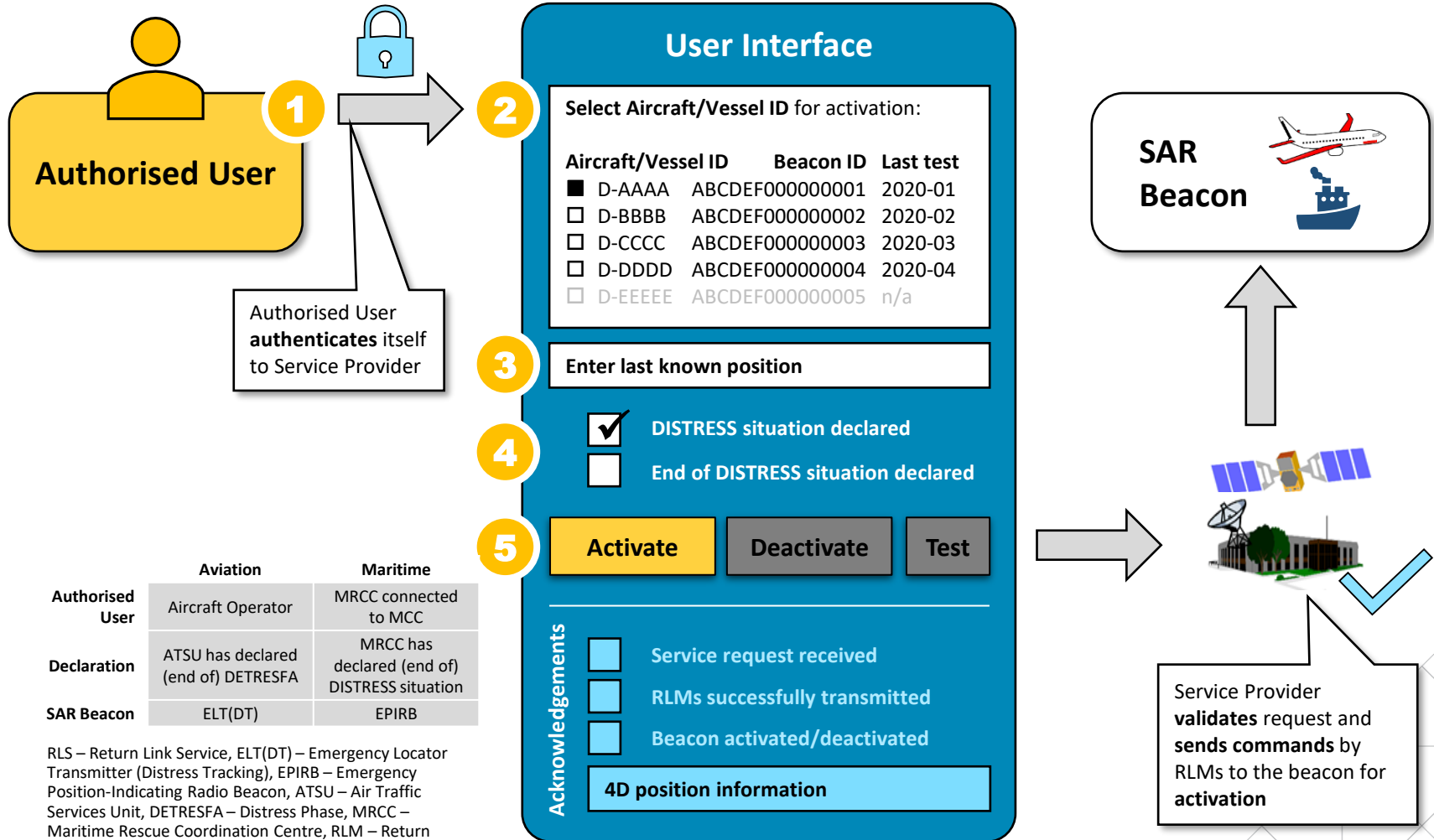
- 1** Authorised User (**MRCC connected to MCC**) requests **Remote Activation**
- 2** Beacon transmits **Distress Alert Messages**
- 3** Service Provider **confirms** activation and starts **tracking**



MRCC – Maritime Rescue Coordination Centre, MCC – Mission Control Centre, C/S – Cospas-Sarsat system and network, MCC – Mission Control Centre, EPIRB – Emergency Position-Indicating Radio Beacon

SAR/Galileo Remote Beacon Activation (RBA)

Smart **User Interface** limits human errors



	Aviation	Maritime
Authorised User	Aircraft Operator	MRCC connected to MCC
Declaration	ATSU has declared (end of) DETRESFA	MRCC has declared (end of) DISTRESS situation
SAR Beacon	ELT(DT)	EPIRB

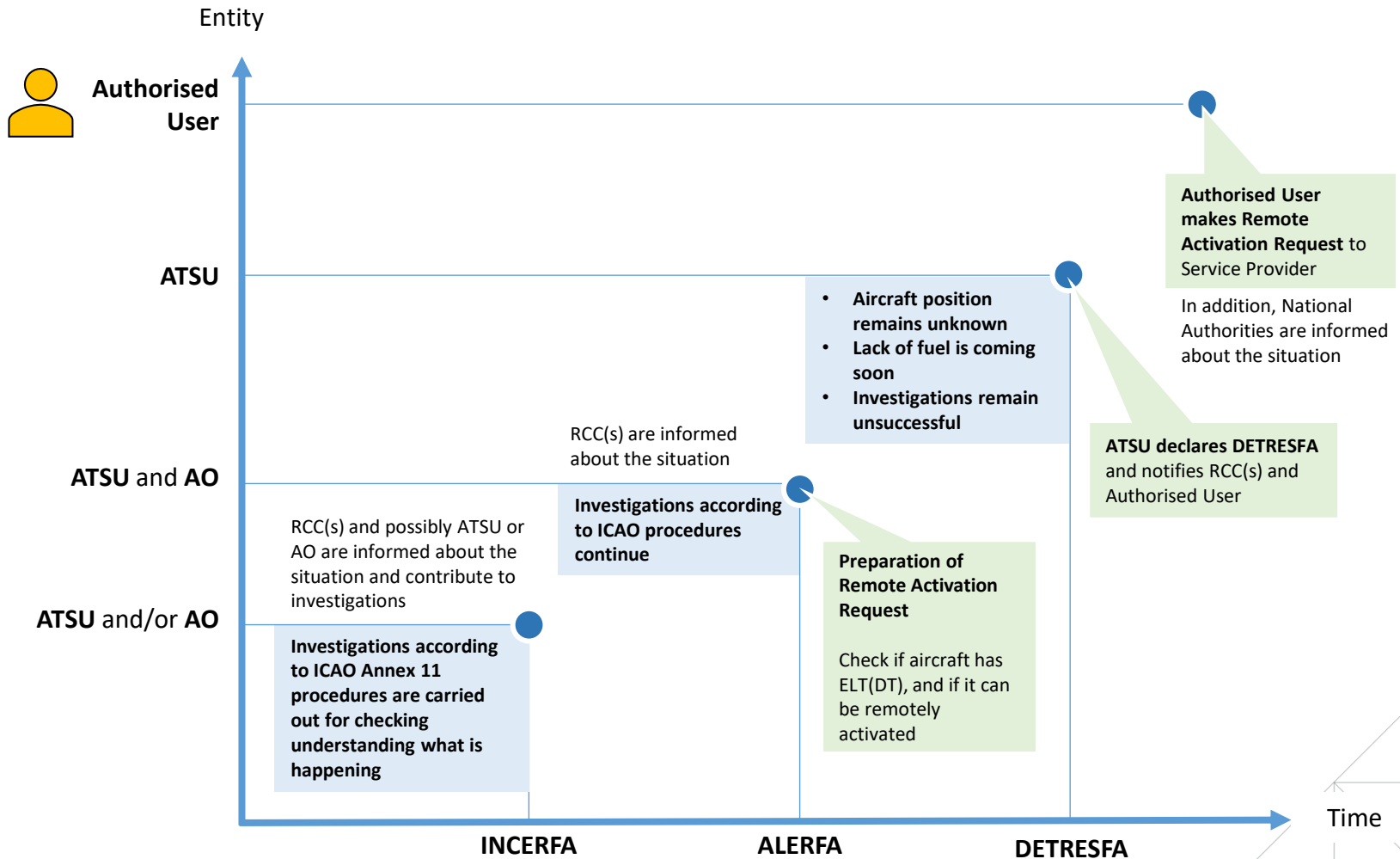
RLS – Return Link Service, ELT(DT) – Emergency Locator Transmitter (Distress Tracking), EPIRB – Emergency Position-Indicating Radio Beacon, ATSU – Air Traffic Services Unit, DETRESFA – Distress Phase, MRCC – Maritime Rescue Coordination Centre, RLM – Return Link Message

BACKUP



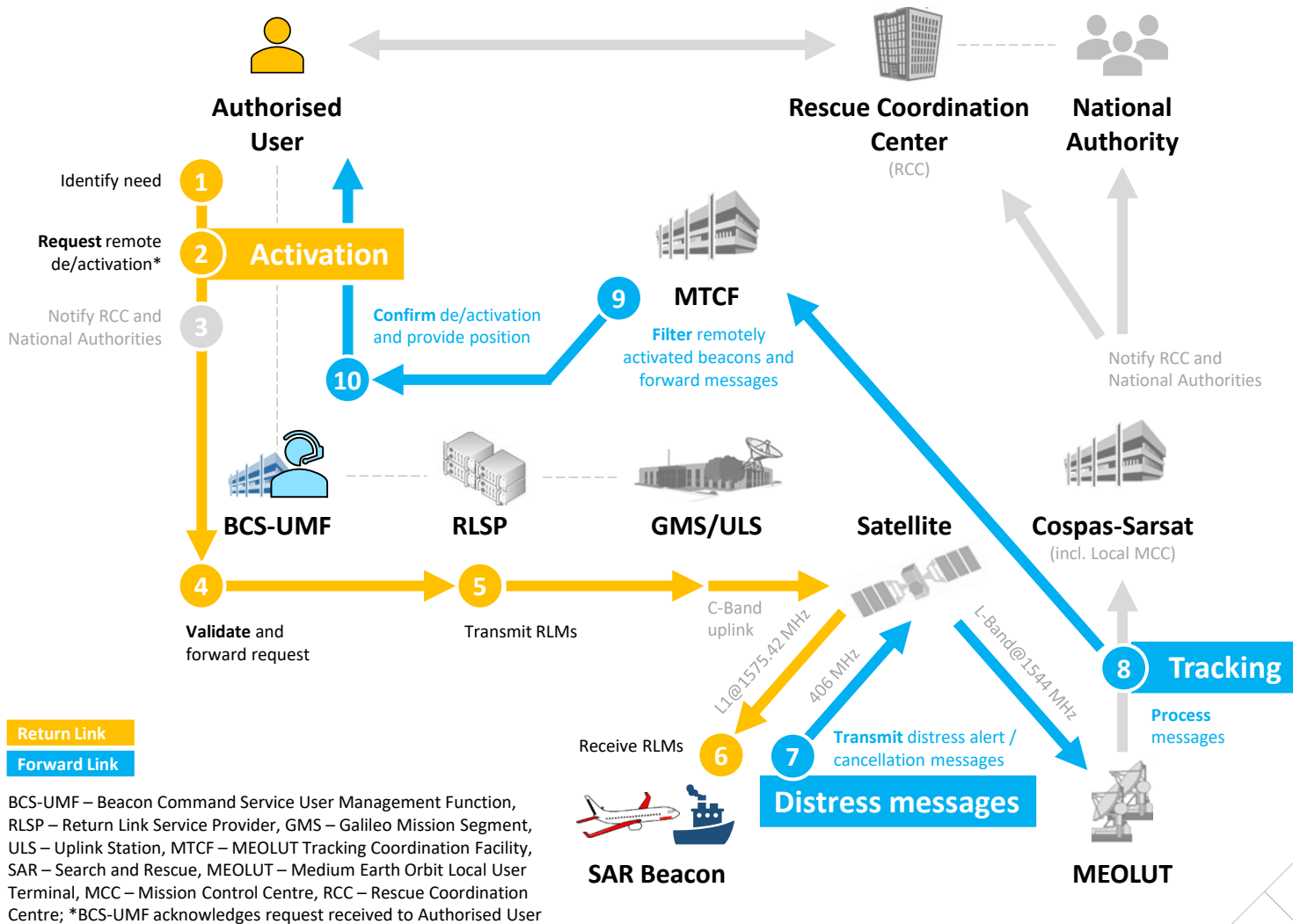
SAR/Galileo Remote Beacon Activation (RBA)

Aviation – Emergency Phase Escalation Process



SAR/Galileo Remote Beacon Activation (RBA)

Concept of Operations – Remote Activation/Deactivation



SAR/Galileo

Two Way Communication via Galileo RLS

Helmut Spitzl, European GNSS Agency

User Consultation Platform, 1 December 2020

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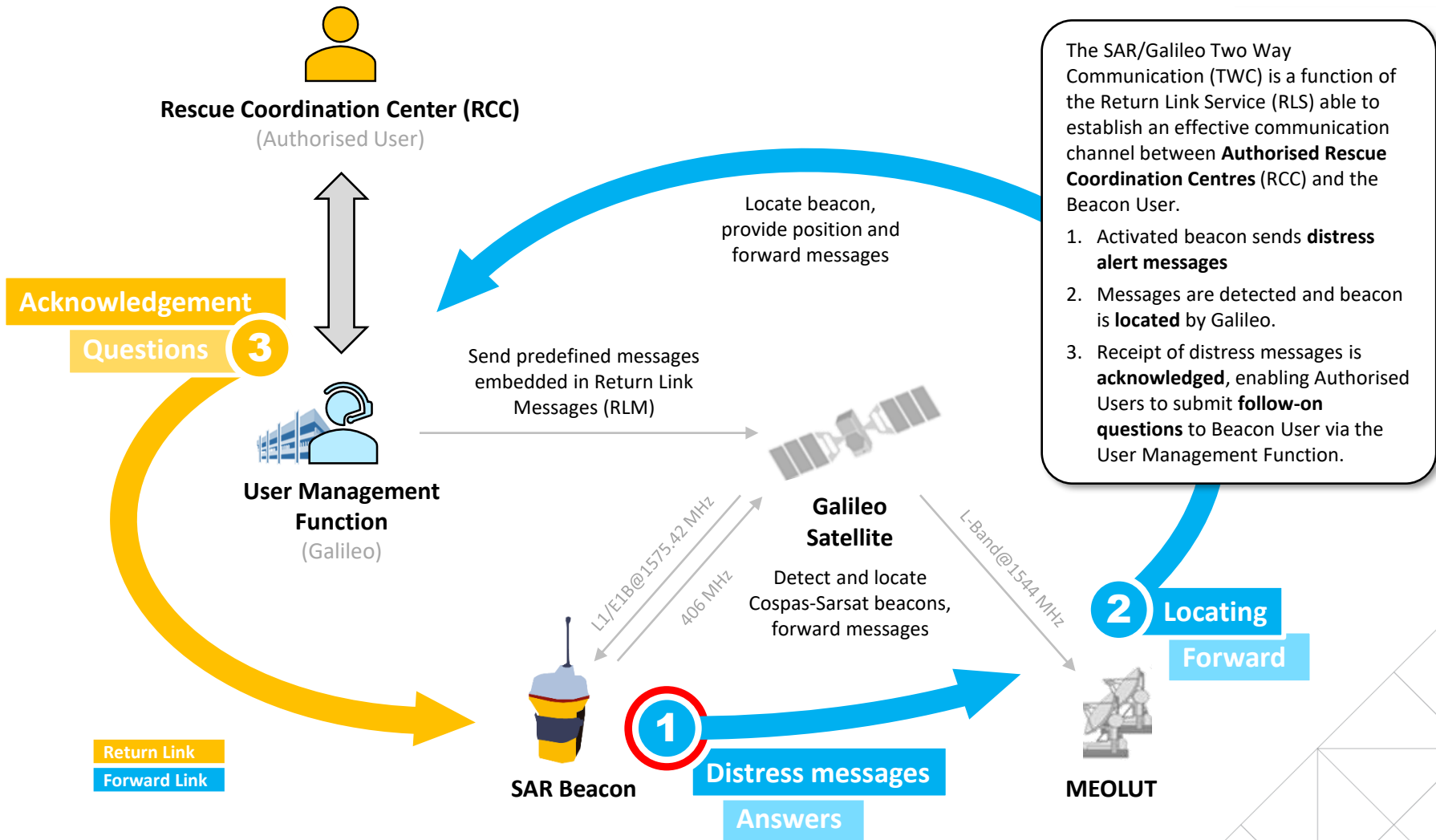


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SAR/Galileo Two Way Communication (TWC)

High-Level Concept

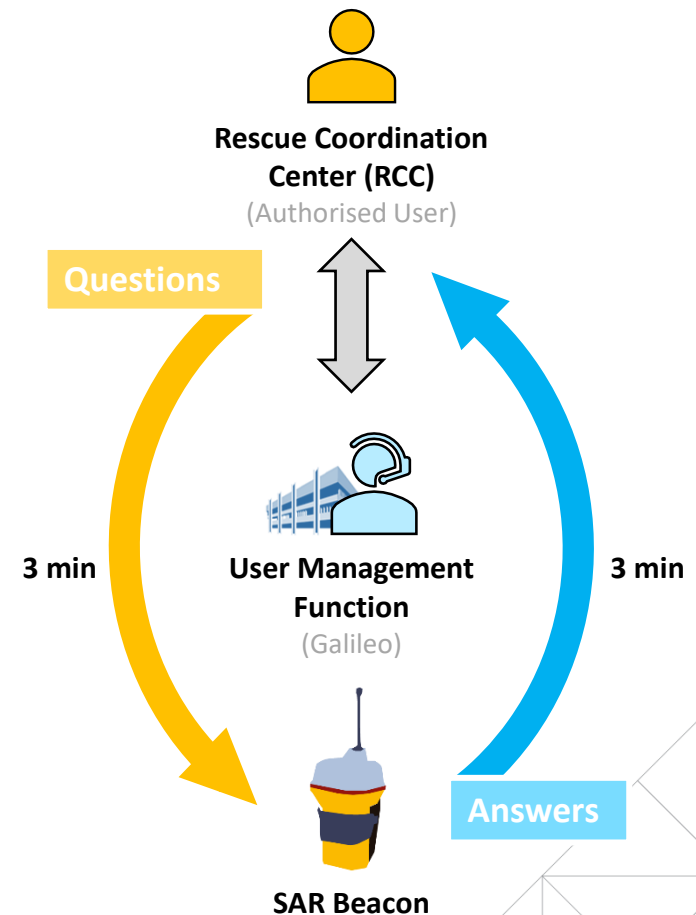


SAR/Galileo Two Way Communication (TWC)

High-Level Concept



- The TWC concept is based on **pre-coded questions** with multiple choice answers, such as:
 - **What type** of distress are you in? medical, sinking boat, fire, crash, false alert;
 - How many people are **in distress**? 1, 2, 3, more;
 - How many people are **injured**? 1, 2, 3, more.
- Short **free text** messages could be an additional option.
- RCCs will have the possibility to **activate several questions** with one single command (RLM) according to the scenario of the distress.
- A **H2020 demonstration** project is about to be launched including the development of a prototype. The project will include the involvement of **SAR forces** for the definition of scenarios and the questions/answers database. Interested national SAR forces are invited to join.



SAR/Galileo

Distress Position Sharing via Galileo RLS

Helmut Spitzl, European GNSS Agency

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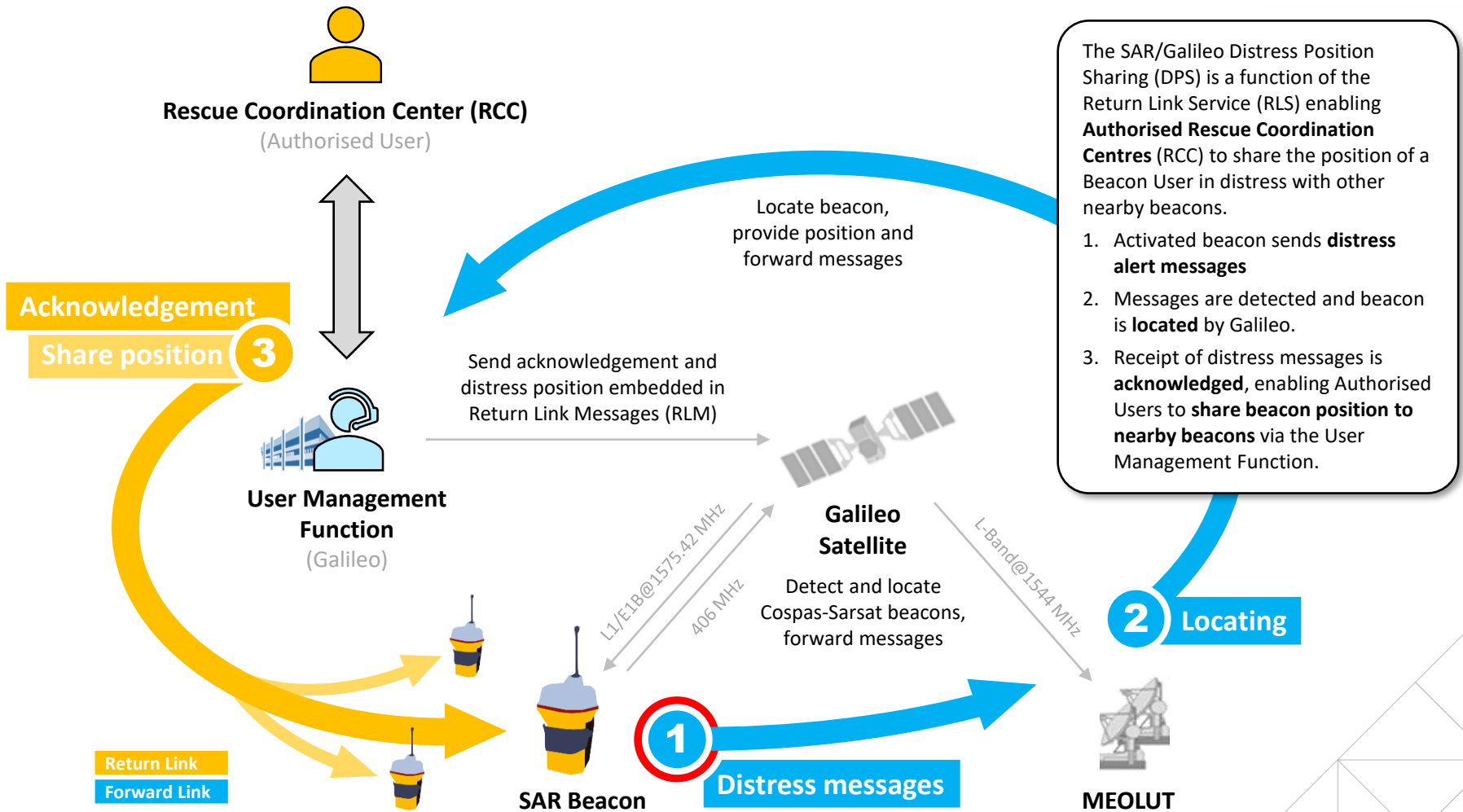


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SAR/Galileo Distress Position Sharing (DPS)

High-Level Concept



The SAR/Galileo Distress Position Sharing (DPS) is a function of the Return Link Service (RLS) enabling **Authorised Rescue Coordination Centres (RCC)** to share the position of a Beacon User in distress with other nearby beacons.

1. Activated beacon sends **distress alert messages**
2. Messages are detected and beacon is **located** by Galileo.
3. Receipt of distress messages is **acknowledged**, enabling Authorised Users to **share beacon position to nearby beacons** via the User Management Function.

THANK YOU



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