**Normal operation**

When registering the TAGs in the ship, the relevant tagid (eg Tagid = 1) is posted from default sector 67 (= shore leave) to sector 66 (= not in the ship). This then runs via NMEA as $PANSSY, total of booked tags increases by one. Furthermore via $PANSPT the message Tag number = 1 for sector 66 takes place.

The entire interface function is mapped by the service SIS\_POS. This holds all status in memory and only writes the relevant changes in the DB POS.

If the tag is then seen by a room brand (eg: room ID 130 detects the signal), the tag is assigned to sector 37 and this assignment is stored in the table pos.pos with a corresponding timestamp. This position change is then also transported via NMEA via $ PANSPT to ILASST ($ PANSPT, 37,1,1).

Important: The number not logged out in the ship (sector66) and ashore (sector 67) are only reported to ILASST via the $ PANSPT record and added up. Only the fields "Georgeted and booked" as well as "missing tags" enter the status field directly from the sentence $ PANSSY.

In the event that TAGS not registered on boarding the vessel are on board, the field TAG "Status" is provided in the sentence $ PANSST. If this TAG is located on board, which has the status of shore leave (sector 67, ie logoff in pos.tags of the DB), a malfunction is reported to ILASST.

**Target**

Tags booked on shore leave (sector 67) must also be displayed via the parcel transfer (NMEA UDP183) to ILASST as a shore leave. A transfer of the TAGS to the status located and logged in may only be done with / through the tagactivator on the service notebook. As a result, the quantity of TAGS in the tag activator and in the BDCS must always be the same, regardless of whether or not there is a TAG in the status of shore leave. The correction should be made in such a way that a "skipping backwards and forwards" of the number "Off-Country Tags" is not recognizable in the BDCS. A blanket "backend" of all TAG status = logoff from pos.tags via $ PANSSPT is not expedient here. In doing so, there should be a maximum latency of 0.2 seconds between the original package and the correction, to ensure that the "correct time" is displayed on the BDCS.

It must be ensured that in the table pos.pos all TAGs with the status "shore leave" are correctly stored in the corresponding status. With a corresponding historical query, the number of TAGs in sector 67 (shore leave) should always be one-to-one with the number of "tags logged offshore" in the PosActivator.

**The error case**

If a tag with the status logoff (= shore leave) enters the ship and is detected by a space tag and located, it is, without being logged in (status = logoff in pos.tags), assigned to the detected sector (e.g., sector 37). As a result, it is displayed quantitatively in the ship without being recorded in the sum "Geortet und Einebukten".

In this case, it would be correct to alert ILASST (failure, $ PANSST) and maintain the sector assignment 67, since the tag is still on "shore leave".

**Error definition**

First, the following information was collected on the existing error cases through interviews and simple experiments:

1. A tag logged off as "shore leave" is seen by a mark in the ship, removed from the shore sector, and counted with "malfunction" status in the sector associated with the tag.

- Correct would be a stay in the sector of shore leave with status "malfunction".

2. A tag known as the Landing database is activated from sleep mode and placed in a holding board near the door to the freewheel. The tag is sporadically seen by this brand, and posted on the freideck after a long period of non-registration.

- Right here would be a stay in the sector shore leave with status "malfunction".

In the following, the following conditions have been developed, which are currently being violated by the misconduct and should be met by the adjustments in the project.

1. The number "Logged Off to Land" (tags in sector 67 (PANSPT)) in the ILAST is always the same as the number of tagged out tags in the tag activator (tags with logoff status in the database).

2. Both live and historical: A tag in the logoff status must not leave sector 67 and must not be included in a sector in the ship.

3. Live: The number of tagged and located tags in the ILAST (from PANSSY) matches the sum of tags in sectors 1 through 66.

For this purpose, the following adjustments should be made on an abstract level.

 The live data stream should be adjusted so that the numbers of tags per sector and the sector status (PANSPT) can be overwritten with information from the database.

 The live data stream should be adjusted so that the numbers of the checked in and located tags (PANSSY) can be overwritten with information from the database.

 Write operations in the database are adjusted so that posted tags cannot leave sector 67.

To achieve this behavior the following should be implemented:

 One NMEA filter each on the two POS systems processing the outgoing UDP data streams to the ILAST servers.

 A database filter that modifies the write operations in the Deregistered Item Location Table on sector 67.

 A database observer or a view that calculates the tags registered per sector, reads out the sector status and prepares them for querying.

A fundamental alternative in the procedure, which however requires a subsequent implementation of large parts of the existing system, is the collection of data for the live data stream adjustments not from the database, but by observing the incoming data streams of the individual space brands. In this case, however, the complete sector (and sector demotion) logic would have to be analyzed and re-implemented. As part of a troubleshooting project, this variant does not seem efficient, because with less effort the data (with a small time offset by the SIS-POS service) can also be collected from the database.

**Software of the POS server**

The requirements of the IT-SiKo regarding the configuration specifications of the operating system on the POS servers correspond to the Bw-IT security configuration W2k8R2-W7 v2.6 as of 03/2013.

Both the hardware-related requirements (for example, blocking USB ports, BIOS password policy) and the operating system-related requirements for a dedicated application server (general and local security policy) have been complied with. Domain-specific security specifications do not apply in this implementation (see CERTBw IT Security Configuration W2k8R2-W7 V.26.pdf).

As a server operating system, Microsoft Windows Server 2008R2 Standard is used in the POS server (see chapter 3.6 IT Security). The database of the POS server is operated via a MySQL Community Server version 5.6.13, which is managed by the MySQL Workbench 5.3 CE (DBMS).

For the POS function, the following software components are installed on the POS server:

 ANS PosMonitorSerial Software (data monitoring of the registration and deregistration stamps)

 ANS PosMonitorTcp software (data monitoring of space brands)

 ANS PosConfigurator software (with this software the adjustable parameters of the TAG can be adjusted (see chapter 4.1.3))