Agenda Item 4.3

STATUS OF ARTEX BEACON GENERIC SOFTWARE DEFICIENCY RECOVERY PLAN

1. ACTION REQUIRED

The Council is invited to:

a) note the updated status and progress made by Artex on their recovery plan to correct the generic software deficiencies noted on specific beacon models; and

b) consider the status of the recovery plan and direct the Secretariat as appropriate on future actions regarding this plan.

2. BACKGROUND

In mid-2006, a generic software deficiency was detected on specific types of beacons manufactured by Artex. Three of the beacon models manufactured by Artex (TAC 104, 112 and 135) were not compliant with C/S T.001 in specific instances.

When Standard Location (TAC 104 and 112) and National Location (TAC 112) protocols are used, the beacons display truncated coarse location data (in the protected first field, PDF-1), instead of rounded data to the nearest position, as required by the specification. This software deficiency results in an incorrect coarse position in approximately 50% of the encoded position data. The final position is corrected with the PDF-2 portion of the message, but in instances where PDF-2 cannot be decoded, the deficiency introduces an additional error in the encoded position provided.

For TAC 135, the Standard and National Location protocols are both calculated and encoded correctly, but the User Location protocol exhibits the same problem where the encoded position is truncated and not rounded.

The maximum position error introduced by the truncation of a given GNSS position is twice the maximum error that would be introduced by the rounding process.

A detailed review of the issue was presented at the CSC-37 Meeting revealing the magnitude and potential impact of these deficiencies on the Cospas-Sarsat System and a voluntary recovery plan, developed by Artex, was also presented and reviewed by the Council. Further updates of the recovery plan were presented at CSC-38 and JC-21 meetings. In general, the correction of the software deficiencies were accomplished as per the steps proposed in the recovery plan, but delays were noted in the implementation of the plan as a result of longer-than-expected durations of the development of corrective algorithms to be retrofitted into the beacons.

3. RECOVERY PLAN AND UPDATED STATUS

The first part of Artex's recovery plan, presented at the CSC-37 Meeting, consisted in the modification and approval of the software of three beacon models: C406-1, C406-2 (Software V134, TAC 112) and C406-N (Software V136, TAC 135). The recovery schedule included an initial period of development, followed by in-house testing, documentation preparation and approval by the FAA, finally completed by formal testing at a Cospas-Sarsat accepted laboratory and approval of the change notices by the Parties. Cospas-Sarsat approval of the software changes was completed in June 2007 (originally planned for March 2007 but delayed due to longer software development). As at 21 September 2007, Artex had received FAA[1] approval for the change on the V136 software, but was still awaiting an approval for the V134 software[2]. Once this part is completed, the beacon manufacturer will be in a position to start manufacturing beacons with no software deficiencies.

The second part of the plan consists in the notification to beacons affected by the software deficiencies and the retrofit of the software changes into units currently in the field. Although this segment of the plan is not formally part of the Cospas-Sarsat type approval process, the presence of beacons with software deficiencies in the System is of direct concern to Cospas-Sarsat.

Artex intends to contact the users of deficient beacons with a letter sent to customers through OEM[3] and their distribution network. Service Notices will also be added to the Artex website (www.artex.net) which will include a special decoding tool for users to determine whether their beacon is affected by the Service Notices. Special retrofit kits with V136 and V134 boards will also be made available this fall. A summary of recovery actions and their completion status is provided in Table 1.

4. RECOMMENDATIONS

The Secretariat recommends that the Council:

a) note the status of the Artex recovery plan; and

b) consider the need for the Secretariat to continue monitoring Artex actions in respect of the implementation of the recovery plan, including actions related to previously built beacons such as:
   - sending of notices,
   - beacon reprogramming,
   - recall/upgrading actions,

   and report on the progress of these actions to the Council.

[1] The Federal Aviation Administration (FAA) is the element of the U.S. government with primary responsibility for aviation safety.
[2] According to Artex, the file has been forwarded to the FAA weeks ago but the FAA did not complete its review yet due to work overload.
[3] Original Equipment Manufacturers such as Boeing, Airbus or others.

Table 1: Summary and Status of Artex Recovery Plan (p. 1/2)

Beacon Model	Location Protocol	Corrective Actions			Approvals	Users	Comments
		Old units	Current units in production	Future units			
TAC 104 Models • ELT110-406 NAV • 110-406 HM NAV • B406-2 NAV • 110-406ED NAV	Standard	No change	Not applicable	Not applicable	No change	Notice to users about reduced accuracies in specific instances STATUS -Letter to affected owners to be mailed through OEMs and distributors on 1 Nov 2007.	No longer in production since 2002
TAC 112 Models • B406-4 • C406-1 • C406-1HM • C406-2 • C406-2HM • G406-4	Standard	Returned units will be upgraded (after approval of changes). STATUS - Retrofit to be begin once retrofit kits are available at Artex repair stations on 2 Jan 2008.	No change, until the modification is approved. Returned units will be upgraded (after approval of changes) STATUS -To be implemented after FAA approval. -Kits with the new modules are going to be available for production on 2 Jan 2008. Any units manufactured until the switch to the modified module happens are going to be part of the recall project.	Modifications to be made on future units. STATUS -To be implemented after FAA approval -Kits with the new modules are going to be available for production on 2 Jan 2008. Any units after that date will be manufactured with the modified modules.	Change Notice to current TAC and new FAA certification requested STATUS -Chance Notice approved June 07 -Awaiting FAA approval (expected Oct 2007)	Notice to users about reduced accuracies in specific instances and about upgrade of returned units. STATUS -Pre-announcement about Service Notice No. 20 will be posted on website on 28 Oct 2007. -Service Notice No. 20 will be posted 28 Oct 2007. -Letter to affected owners to be mailed through OEMs and distributors on 1 Nov 2007 (letter requires copy of SN).	
TAC 112 Models • B406-4 • C406-1 • C406-1HM • C406-2 • C406-2HM • G406-4	National	Returned units will be upgraded and reprogrammed to standard location protocols STATUS -135 beacons to be reprogrammed to standard location after FAA approval and availability of retrofit kits. Retrofit kits are going to be available for retrofit by Artex repair stations on 2 Jan 2008.	Stop coding with National Location Protocol. STATUS -Already implemented as of Oct 2006	With software fix in place Artex will now have the option to sell National Protocol units.	This protocol is to be removed from TAC 112. STATUS - Completed as part of a Change Notice in 2006 (Nov 06)	Notice to users to recode their beacons with Standard Protocol. STATUS -Pre-announcement about Service Notice No. 20 will be posted on website on 28 Oct 2007. -Final Service Notice No. 20 will be posted 28 Oct 2007. -Letter to affected owners to be mailed through OEMs and distributors on 1 November 2007 (letter requires copy of SN).	Coding no longer implemented on this beacon.

Table 1: Summary and Status of Artex Recovery Plan (p. 2/2)

Beacon Model	Location Protocol	Corrective Actions			Approvals	Users	Comments
		Old units	Current units in production	Future units			
TAC 135 Models • C406-N • C406-N-HM	User	Artex will replace the units in the field (after approval of changes).	Temporary stop to the sale of this model.	Modifications to be made on future units.	Change Notice to current TAC and new FAA certification requested	Notice to users about the reduced accuracies and about the replacement of units in the field. Notification to users	
		STATUS -Retrofit kits are going to be available for retrofit by Artex repair stations on 1 Dec 2007.	STATUS -Already in place	STATUS -Kits with the new modules are going to be available for production on 1 Dec 2007. Any units after that date will be manufactured with the modified modules.	STATUS -Chance Notice approved May 07 -FAA approval received	STATUS -Pre-Announcement about Service Notice No. 19 was posted on website 31 Aug 2007. -Service Notice No. 19 will be posted 14 Oct 2007. -Letter to affected owners to be mailed through OEMs and distributors 14 Oct 2007 (letter requires copy of SN).	

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