

INSAT-2B EDGE OF COVERAGE TEST

1. ACTION REQUIRED

The Joint Committee is invited to review INSAT-2B edge of coverage test results. The test was carried out as a part of action item, TWG-15/AI.9 on India and Australia.

2. INTRODUCTION

During 17 to 31 May 2001, the INSAT-2B edge of coverage test was carried out with the support of Australia.

3. TEST SETUP

The AUMCC undertook liaison with various shipping lines and agents to acquire a suitable vessel for the test. The Singapore registered container vessel "Kota Wijaya/9VHR" was identified as being suitable and permission was obtained from the owners and agents to place the beacon on board the vessel during its voyage from Brisbane, Australia to New Zealand and return.

On request from INMCC, AUMCC supported the test requirements by organizing two long-term separate test transmissions (HEX ID: BEFC000000000000) from the Gold Coast, Queensland, Australia (28 08.5 S 153 28.0 E) on 14 May 2001 and 16 May 2001 prior to placing the test beacon aboard the vessel. A SIT 605 messages was transmitted to all MCCs advising of these test transmissions. From this site in Australia the test radiation were not picked-up by INSAT-2B, though confirmed by the Wellington GEOLUT.

Given that Insat-2B did not detect the test transmission on 14 May and 16 May 2001 arrangements were made for the vessel to continue to carry beacon on its voyage to Singapore in case the edge of coverage was below some 20 deg. elevation. Arrangements were also made to use Inmarsat-C to poll the vessel every hour on the half-hour and for the ship's officers to log the vessel's position every hour on the hour.

On 17 May 2001 the AUMCC engineer installed the beacon on board the vessel prior to it sailing. The installation required long cables, a new battery, protective covering from the salt air/water and clamps to secure the beacon on the ship. The beacon was switched on at 0300 UTC, 17 May 2001 and subsequently switched off at 1215 UTC, 31 May 2001.

4. TEST RESULTS

Preliminary test prior to undertaking actual test was done by radiating the beacon from the Gold Coast. No detection was reported by INSAT-2B (93.5 degrees east) from this location. INSAT-2B elevation with respect to Gold Coast location 28 08.5 S 153 28.0 E is about 18 degrees.

Immediately after installation and activating the beacon on the ship at 0300 UTC, 17 May 2001, again there was no pick-up by INSAT-2B; subsequently when the vessel sailed from Brisbane the beacon was detected and then lost, regained and lost again.

INSAT-2B reported the detection of the beacon from 1506 UTC, 17 May 2001 until 0626 UTC, 20 May 2001 except for a period of some 6 hours from 0515 to 1146 UTC, 18 May 2001. The vessel's position at the these times were:

- 1506 UTC, 17 May 2001 : 26 44 S 153 12 E – beacon first detected
- 0515 UTC, 18 May 2001 : 28 13 S 157 52 E – lost beacon transmission
- 1146 UTC, 18 May 2001 : 28 56 S 160 13 E – regained beacon detections
- 0626 UTC, 20 May 2001 : 34 35.8 S 173 41.8 E – lost beacon detection

This puts the loss of INSAT-2B detection just below the horizon, elevation about -0.5 degrees.

The vessel departed Auckland, New Zealand for Brisbane, Australia at 0700 UTC, 28 May 2001. On the vessel's return to Brisbane from New Zealand the beacon was not detected until about 12 deg elevation with respect to INSAT-2B. INSAT-2B reported detection of the beacon was at 1311 UTC, 30 May 2001, at that time master reported vessel's position at 28 35.0 S 159 05.0 E. INSAT-2B elevation corresponding to this location is about 12 degrees. The beacon was detected until 1215 UTC, 31 May 2001, the time at which the beacon was switched off and removed from the vessel.

Positions as recorded by the ship and the Auspoll reports were received from AUMCC. Beacon detection details were compiled by INMCC as per time and provided to AUMCC.

At the end of the test AUMCC engineer traveled to Brisbane to retrieve the test beacon from the vessel and thanked Master and Officers for their cooperation.

5. CONCLUSIONS

The edge of coverage test exercise proved that the INSAT-2B theoretical edge of coverage matches with experimental one, which was recorded during onward journey of the ship from Brisbane to Auckland. However interruption in detection of the signal, and non-detection of the signal between 0 & 12 deg elevation of INSAT-2B during return journey need to be investigated. The possible reasons could be:

- The satellite completed its operational life (9 years in orbit operations), and it is in an inclined orbit.
- Interference processing at GEOLUT could be one of the reasons for masking the beacon signal. The present Indian GEOLUT system is the first generation processing system, and needs refinements for improved detection capability and 406 MHz interference handling, which would be incorporated in 2nd generation system currently in planning stage.

The present Indian GEOLUT system, though experimental one, is supporting detection and distribution of 406 MHz alerts. Its full operational capability would be realized after commissioning of 2nd generation GEOLUT system, which is to be operationalised before the launch of INSAT-3A and INSAT-3D.



Fig 1: Test Beacon as seen mounted on the vessel “Kota Wijaya/9VHR”

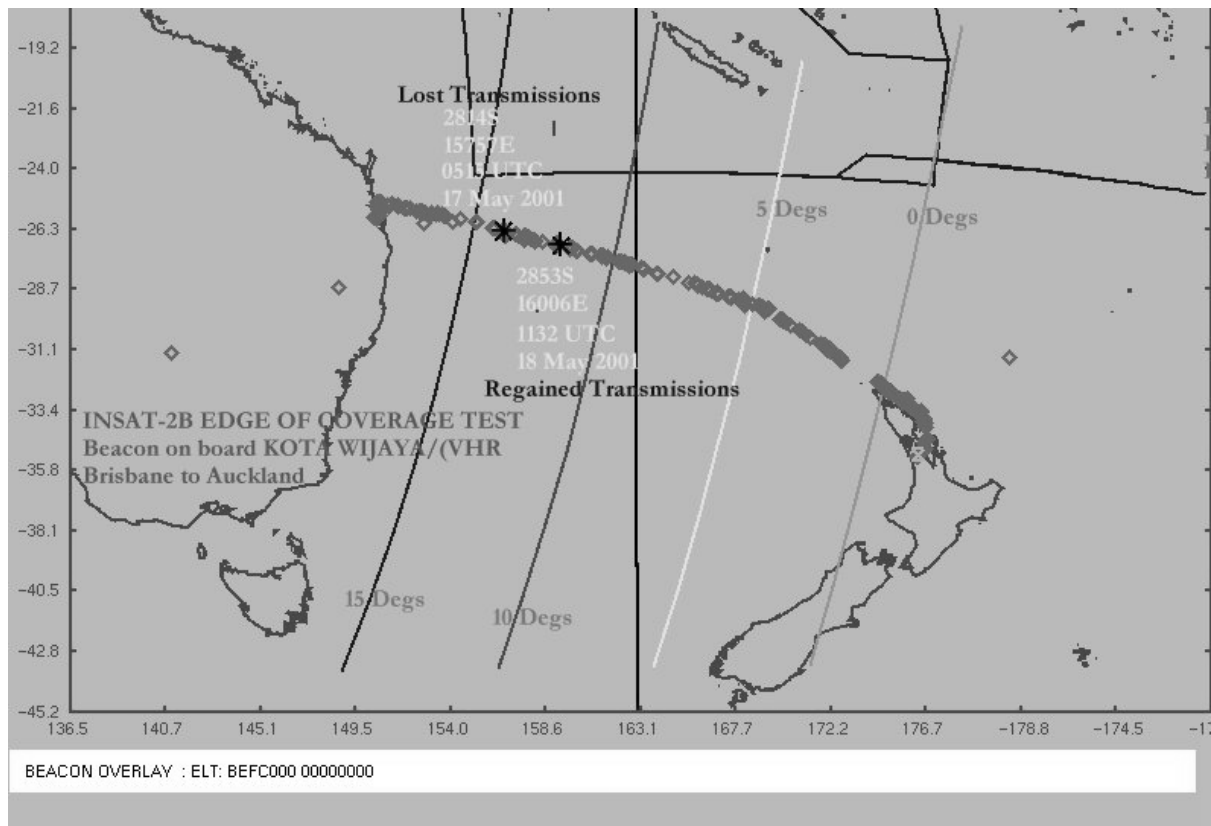


Fig 2: Vessel's actual course of sailing, between the two stars, GEOLUT lost detection

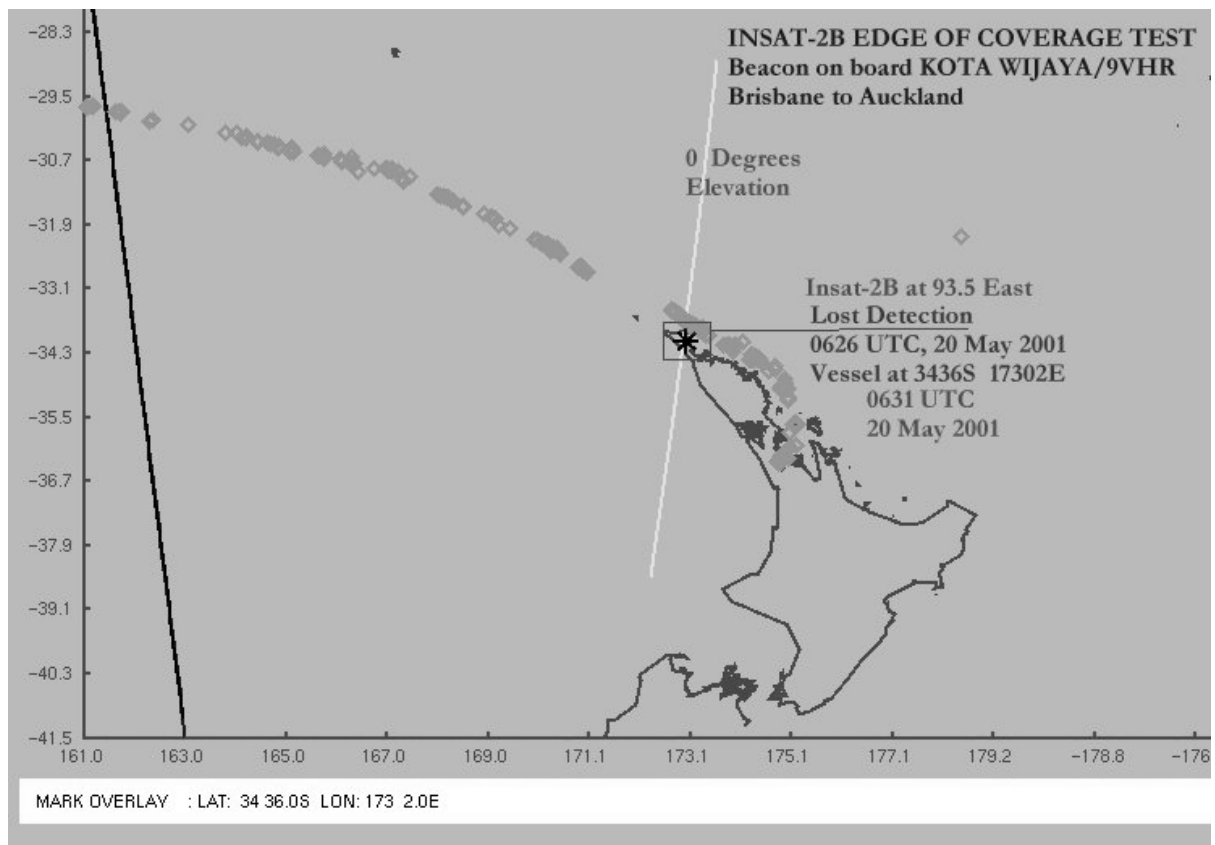


Fig 3: INSAT-2B, loss of beacon detection at 0 deg elevation

Fig 4: Kota Wijaya Class of vessel used for Edge of Coverage Test