



Aviation Safety Council

Taipei, Taiwan

CI611 Accident Investigation

Factual Data Collection

Group Report

**Wreckage Recovery and Transportation
Group**

June 03, 2003

ASC-AFR-03-06-001

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II. History of Activities

Date	Description
05/26/02 ~ 06/09/02	<ul style="list-style-type: none"> ● Floating Debris picked up by fishing boats, Navy ships, and Coast Guard vessels
05/28/02	<ul style="list-style-type: none"> ● Command post set-up at Makung Air Force Base (AFB)
05/29/02 05/30/02	<ul style="list-style-type: none"> ● Recorders' Underwater Locator Beacon (ULB) signal detected ● Main Wreckage Field (MWF) found by the Navy
06/12/02	<ul style="list-style-type: none"> ● Command post moved to the 5th Floor of the Makung Harbor Building
06/14/02	<ul style="list-style-type: none"> ● Global Industries' salvage vessel Jan Steen arrived
06/16/02	<ul style="list-style-type: none"> ● On-scene command authority transferred from AACERC to ASC
06/18/02 ~ 06/19/02	<ul style="list-style-type: none"> ● CVR and FDR recovered by Jan Steen Divers and Navy Divers
08/15/02	<ul style="list-style-type: none"> ● Taoyuan Air Force Base (TAFB) Hangers #1 and #2 officially activated for CI611 wreckages placement and examination
08/15/02 ~ 08/25/02	<ul style="list-style-type: none"> ● Recovered wreckages transported from Makung to TAFB in four shipments
09/16/02	<ul style="list-style-type: none"> ● Jan Steen mission completed
09/20/02 ~ 10/17/02	<ul style="list-style-type: none"> ● Wreckage recovery operation by trawlers
10/20/02 ~ 10/21/02	<ul style="list-style-type: none"> ● Final shipment of wreckage transportation to TAFB

10/21/02	● Completion of the CI611 wreckage recovery operation
04/16/03	● Wreckages recovered by Mainland fishing boat transported to TAFB

III. Factual Description

1.18.3 Wreckage Recovery

1.18.3.1 Introduction

The ASC personnel erected a command post in Makung AFB immediately after confirmation of the accident. At the same time, the Aircraft Accident Central Emergency Response Center, (AACERC) was established on the second floor of the Makung Airport Terminal Building with the Minister of Transportation and Communications (MOTC) as the on-scene commander, and the Directorate General of the CAA as the Deputy commander. In earlier stage, the AACERC and the ASC wreckage recovery operation were overlapped due to the combined effort to search the victims' body, and recovered wreckages as it came along. Soon after the wreckage salvage vessel Jan Steen arrived, the on-scene commanding authority was transferred from AACERC to ASC and the major task were then focused on the victims body and the wreckage recovery from the ocean floor.

In essence, the wreckage recovery operation can be divided into four phases with adjacent phases overlapping the previous one:

(1) Phase 1 (05/26-06/10, 2002)

Floating debris and body recovery, the search of the recorders' ULB signal, and mapping of the wreckage spread

(2) Phase II (06/02 – 06/15, 2002)

Wreckage recovery by the Asia-Pacific Inc.

(3) Phase III (06/14- 09/16, 2002)

Jan Steen Salvage Ship Operation and the recovery of the two recorders

(4) Phase IV (09/04 – 10/21, 2002)

Wreckage recovery via trawling

The operations of those four phases are described in the following subsections. During the months between late May and early October 2002, environmental conditions around the accident area were as follows:

Wind Magnitude

Stage 3~5, gusted to stage 8
3-5

Wind Direction	North and Southwest
Underwater current	2 to 5 knots
Underwater Current Direction	Northwest
Wave Height	1~2 meters

It was later found that the depth of the wreckage spread was about 50 to 70 meters and the ocean floor where the wreckage resided was relatively flat with packed sand.

There were three typhoons passing through the accident site during the wreckage recovery period, each typhoon delayed the salvage operation for approximately 6 to 8 days.

1.18.3.2 Phase I operation

The phase I operation commenced in the afternoon of the accident day as the first few floating wreckage, fuel trace, and bodies were spotted by the search and rescue helicopters. This phase consisted of three distinct operations: 1. Search and rescue operation of the floating debris and bodies, 2. Mapping of the wreckage spread and, 3. Search of the recorders ULB signal.

1.18.3.2.1 Search and Rescue operation

The captains of the Search and Rescue helicopters arrived at the accident site about 1800 Taipei Local Time and found many floating debris and fuel trace. The fuel trace was from the southwest to the northeast and the length of the fuel trace was nearly 1 NM. Most of the floating debris was around the southwest direction of the fuel trace. The fuel trace was located about N 23° 58'40", E119°41'34". Slide/rafts and floating debris were found at N 23° 58'50" ,E 119°44'50". Fuel trace were also found about N 23°53'6.6", E 119° 18'33" .

According to the above information, a search and rescue zone designated as zone A was determined and then divided into 25 sub-zones. Center of the Zone A was at N 23°58'40", E119°41'34", which was the beginning of the fuel trace (as shown in Figure 1.18-1). Zone B was later added based on the other trace of the fuel with its center located at N 23°53'6. 6", E 119°18'33". Zones C, E, F, G, H, K, L were further determined by the radar track of the accident flight

and the ocean current flow prediction.

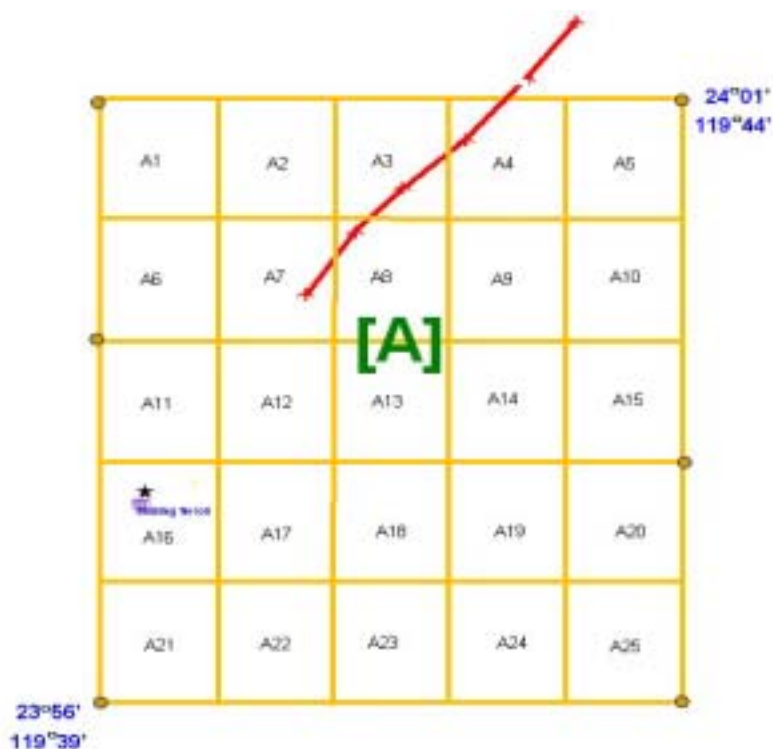


Figure 1.18-1 Location of Zone A

This part of the operation was directed by the AACERC. There were numerous agencies/parties involved in this operation including: Coast Guard, Navy, National Ocean Research Center (NORC), and commercial fishing boats. The recovered floating wreckages consisted mostly of the aircraft skins, pieces of the control surfaces, seats, etc. Most of the floating wreckages were in fiberglass nature. During this phase, 450 pieces of the floating debris, and 82 floating bodies were recovered.

The recovered floating wreckages were transported to the Makung Air Force Base hanger.

1.18.3.2.2 Wreckage Field Mapping Operation

It was felt that some of the victims bodies could be trapped inside the sunken aircraft, hence, a wreckage field survey operation were immediately commenced in concurrence with the Search and Rescue operation.

The Mapping operation consisted with the teams from various organizations; Ocean Research Ship No. 1, an 800-ton ship from the National Taiwan

University, Ocean Research Ship No. 2, an 250-ton ship from the National Marine University, Ocean Research Ship No. 3, an 250-ton ship from the National Sun Yat-Sen University, four Navy Under Water Research Vessels, A research vessel from Industrial Technology Research Institute (ITRI), and Fishery Research No. 1 from Taiwan Fisheries Researcher Institute (TFRI) who carried the instruments, equipments and members of American Underwater Search & Survey Ltd (AUSS), contracted by the China Airlines. Almost all the ships are equipped either with the Side-Scan Sonar (SSS), or the Multi-Beam Sonar (MBS), some with Remote Operating Vehicle (ROV). Wreckage site security was provided by the ROC Coast Guard, which patrolled the area and excluded unauthorized vessels from the recovery area. (See Figure 1.18-2).



Figure 1.18-2 The Coast guard ship patrolled the accident site

The wreckage survey of Zone A was done by the Navy Under Water Research Vessel (See Figure 1.18-3). The area covered was 5NMx5NM with the corners of the rectangular Zone A as (as shown in Figure 1.18-4):

23°56'N, 119°39'E 24°01'N, 119°39'E

23°56'N, 119°44'E 24°01'N, 119°44'E



Figure 1.18-3 The Navy Under Water Research Vessel searched the underwater targets

Zone B was also surveyed by the Navy Under Water Research Vessel. The area covered was 3NM x3NM (as shown in Figure 1.18-4):

23°51'N, 119°17'E 23°54'N, 119°17'E

23°51'N, 119°20'E 23°54'N, 119°20'E

Zone C was surveyed by NCOR (See Figure 1.18-5) and the area covered was 5NMX10NM (as shown in Figure 1.18-4):

23°59'N, 119°34'E 23°49'N, 119°34'E

23°49'N, 119°39'E 23°59'N, 119°39'E



Figure 1.18-5 The NCOR survey ships

Zone G was also surveyed by NCOR and the area covered was 5NMX2NM (as shown in Figure 1.18-4):

23°59'N, 119°34'E 23°49'N, 119°34'E

23°49'N, 119°39'E 23°59'N, 119°39'E

Zone F was also surveyed by the Navy Under Water Research Vessel and the area was 5NMX5NM (as shown in Figure 1.18-4):

23°56'N, 119°44'E 23°51'N, 119°44'E

23°51'N, 119°39'E 23°56'N, 119°39'E

Zone E was surveyed by the Ocean Research Ship No. 3 of the National Sun-Yat-Sun University using SSS and the area was 5NMX10NM (as shown in Figure 1.18-4):

23°58'N, 119°44'E 24°08'N, 119°44'E

23°58'N, 119°49'E 24°08'N, 119°49'E

Zone H was surveyed by ITRI using SSS and the area was 5NMX10NM (as shown in Figure 1.18-4):

23°54'N, 119°29'E 23°44'N, 119°29'E

23°54'N, 119°34'E 23°44'N, 119°34'E

Zones K and L were extended as the result of the information provided by the Primary Surveillance Radar (PSR) and Doppler weather radar. Due to the lack of resource, these two areas were not surveyed. The area of Zone K was 5NMx5NM (as shown in Figure 1.18-4):

23°58'N, 119°44'E 23°52'N, 119°44'E

23°58'N, 119°49'E 23°52'N, 119°49'E

And the area of Zone L was 5NMx5NM (as shown in Figure 1.18-4):

23°58'N, 119°49'E 24°03'N, 119°54'E

24°03'N, 119°49'E 23°58'N, 119°54'E

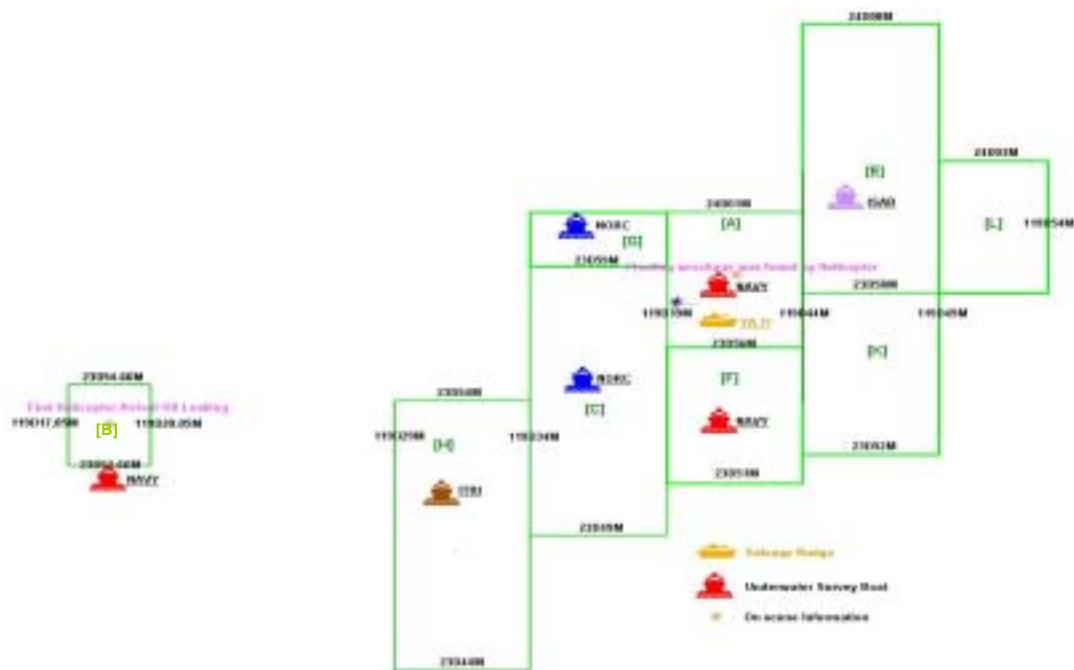


Figure 1.18-4 Location of the mapping Zones A, B, C, E, F, G, H, K, L

After the preliminary survey, no targets were found in zones H, B and F. On May 30, 2002, an approximately 40-meter target were found in Zone A by the Navy Underwater Research Vessels and later on confirmed by the Navy ROV. This field was designated as the Main Wreckage Field (MWF). Thus, in order to integrate all the resources for detail survey of this zone, all vessels were focused on this area. When the AUSS joined the survey operation, high resolution SSS were used to further refine the MWF.

1.18.3.2.3 Flight Recorders ULB Signals Search Operation

The two flight recorders were equipped with the Underwater Locator Beacon (ULB) signals; each emitted an approximately 37.5 KHz signal soon after it contacted water. The recorders ULB signal search team consisted of a 20-ton research boat from CSIST [See Figure 1.18-6 (a)], two Coast guard vessels, and two Navy Under Water Research Vessels. In addition to the personnel from the ASC and CSIST, NTSB and Boeing investigators were also participated in the search operation. one of the Coast guard vessel with an investigator on-board spotted the recorders' ULB signals on May 29, 2002. Later on, the Ocean Research Ship No. 3 from National Sun-Yet-San University joined in the search operation. From the day of the ULB signal discovery, till the time the two recorders were recovered, most of the effort was focused on the refinement of the signal location [See Figure 1.18-6 (b)]. Both the Dukane detectors from Boeing Company and from CSIST, together with the Benthos detector from AUSS were used for the signal detection.



Figure 1.18-6 (a) The CSIST 20-ton search boats, (b) The investigators made most of effort on refinement of the signal location

1.18.3.3 Phase II Operation

The Asia-Pacific Inc. contracted by the China Airlines did the early phase of the wreckage recovery. The vessel used by the Asia Pacific for the recovery operation was a 1,254-ton barge [See Figure 1.18-7 (a)]. It has a 250-ton crane and a team of 15 divers equipped with decompression chamber.. This boat has no propulsion capability therefore required tugboats to anchored before the diving operation. The divers dived in a two-men team. For 65 to 70 meter depth of water, working time on the seabed was limited to less than 30 minutes, including the time needed from the ocean surface to the seabed. Depend upon the sea statedivers would either come to the surface and went

immediately into the decompression chamber, or stopped several times at intermittent depth for decompression, in that case, the time spend in the decompression chamber would be reduced. Asia Pacific's wreckage recovery task was concentrated at A12, where the 40-m main wreckage was spotted, it later on changed position to A 18, and A14. During this phase of the operation, Asia Pacific divers recovered Engines # 1 and #4, item 526, the R/H wing upper panel, item 487, the upper deck panel, and item 546, the L/H wind landing gear with L3 door. It also recovered 15 bodies. Asia Pacific was decommissioned on July 3, 2002.

Since the wreckage pieces recovered by Asia Pacific were relatively large, the Makung Air Force Hanger could no longer handle the volume of the wreckage. The recovered wreckage was placed on the Coast Guard's No. 3 dock [See Figure 1.18-7 (b)].



Figure 1.18-7 (a) The 1,254-ton barge used by the Asia Pacific for the recovery operation, (b) The recovered wreckage was placed on the Coast Guard's No. 3 dock

1.18.3.4 Phase III Operation

On June 12, 2002, the investigation team re-located the command post to the 5th floor of the Makung Harbor Building [See Figure 1.18-8 (a). Daily progress meeting [See Figure 1.18-8 (b)] was held at the adjacent meeting room loaned to the team by the harbormaster's office. The command post was served as the command, control and communication center of the entire operation included the salvage vessel, wreckage spread survey ships, the coast guard, and the barges



Figure 1.18-8 (a) The command post in the 5th floor of the Makung Harbor Building, (b) Daily progress meeting

The salvage vessel Jan Steen of the Global Industries [See Figure 1.18-9 (a)], contracted by the China Airlines, arrived Makung on June 14, 2002. Jan Steen is a salvage ship equipped with Dynamic Positioning System II (DP II), and a saturation diving chamber [See Figure 1.18-9 (b)] with a team of 16 divers. Jan Steen also equipped with a 100 HP ROV (Thales Sealion) with Simrad sonar, two 180-degree underwater video cameras and two mechanical arms [See Figure 1.18-9 (c)]. If weather permitted, the Jan Steen divers and ROV could operate nearly 24 hours a day. However, because of the ocean current, a typical day work consisted of 12 to 16 hours of the salvage operation.



Figure 1.18-9 (a) The salvage vessel Jan Steen- upper-right photo, (b) a saturation diving chamber - left photo, (c) a 100 HP ROV on Jan Steen- lower-right photo

There were total of fifty-six people on board the Jan Steen. The ship personnel were separated into three groups: the diving supporting group, the ROV supporting group, and the ship operation group. During the wreckage salvage operation, there were usually three to four investigation team personnel on board headed by an ASC investigator, plus one person from the Boeing Company, one from CAL and one person from either NTSB or FAA. The ASC investigator on board served as the commander to decide where and what wreckage should be worked on [See Figure 1.18-10 (a)]. When aboard, the investigation team usually worked nearly 20 hours a day with two hours of sleep in between, twice a day. The group members stayed on the ship, looking through the ROV's monitor as it searched the seabed, and identified the parts of the aircraft [See Figure 1.18-10 (b)]. The group observed and measured, described and sketched the wreckage pieces. Every three days, a new shift would replace the old ones. The departing group member brought all the records back to the Command Post, and compiled them into a database. The new group members would bring the updated latitude, longitude and the updated recovered wreckage data for the on-board commander [See Figure 1.18-10 (c)].



Figure 1.18-10 (a) The ASC investigator on board served as the commander - upper-left photo, (b) the Engineer looked through the monitor of ROV- lower-left photo, (c) Transport personnel and wreckage data through Coast Guard boats- right photo

Both the investigation team members and recovered bodies were transported by the coast guard boats [See Figure 1.18-11 (a)]. The recovered wreckage was first hoisted onto the Chau-Hsen Enterprise Co. Ltd. barge [See Figure 1.18-11 (b)] contracted by the CAL, the wreckage immediately was rinsed with fresh water, and marked with the longitude and latitude of location where it was recovered. Preliminary identification of the piece was also performed. Once the cargo space was full, the Chau-Hsen barge would sail to Makung harbor and unloaded the wreckage on either the Coast Guard dock #3 or the Navy dock #1.



Figure 1.18-11 (a) A recovered body was transferred to a Coast Guard boat - left photo, (b) a piece of wreckage was transferred to a barge- right photo

There were two teams involved in the recovery of the recorders, the Navy divers and Jan Steen divers. The CVR was recovered by the Jan Steen divers on June 18, 2002 [See Figure 1.18-12 (a)]. The position of the CVR is as follows:

Lat: 23°58'58. 612" N, Long: 119°41'36. 736"E

The FDR was recovered by the Navy divers on June 19, 2002 [See Figure 1.18-12 (b)]. The position of the FDR is as follows:

Lat: 23°58'58. 464"N, Long: 119°41'17. 711"E

Distance between two recorders was about 610 meters. Relative positions of the two recorders, as well as the wreckage distribution are shown in Figure 1.18-13.



Figure 1.18-12 (a) An investigator was putting the CVR into fresh water- left photo, (b) Navy's diving bell was leaving the ocean surface with the FDR - right photo

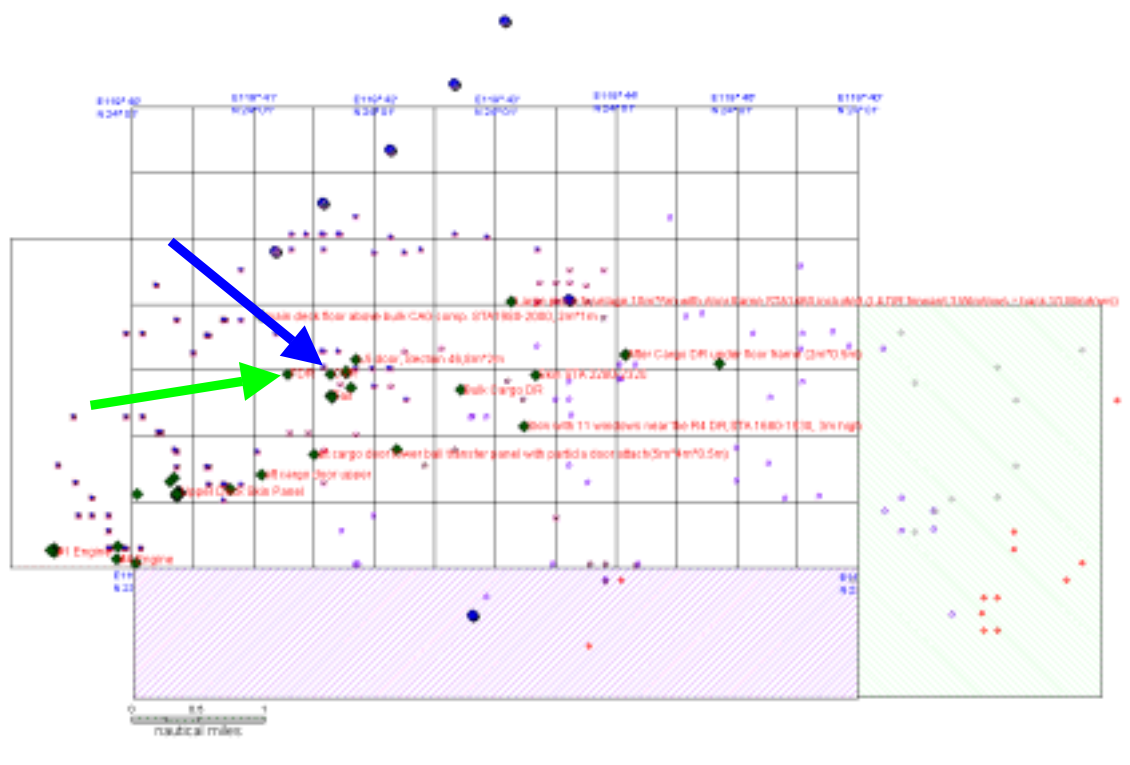


Figure 1.18-13 Relative position of the two recorders (FDR pointed by green arrow, CVR pointed by blue arrow) , as well as the wreckage distribution

As the mapping information became more precise, the wreckage spread was then divided into four areas color coded as Red, Yellow, Green, and Blue. The areas and major wreckage pieces recovered from each area are described as Table 1.18-1:

Table 1.18-1 the positions of search areas and major pieces recovered from each area

<p>Red Zone corner points</p> <p>N 24 02' 00" E 119 47' 00"</p> <p>N 24 02' 00" E 119 39' 48"</p> <p>N 23 59' 12" E 119 39' 48"</p> <p>N 23 59' 12" E 119 41' 00"</p> <p>N 23 56' 00" E 119 41' 00"</p> <p>N 23 56' 00" E 119 47' 00"</p>	<p>The Red Zone covers an area of approximately 73 square nautical miles (10.1 NM X 7.2 NM). This zone contains the earlier parts of the aircraft recovered in the wreckage debris spread along the flight path.</p> <p>Wreckage recovered from the red zone: empennage, part of Section 48, aft pressure bulkhead, most of Section 46 structure, Flight Data Recorder, Cockpit Voice Recorder, aft galley, Section 46 main deck floor, aft cargo compartment door, bulk cargo door, cargo compartment floor and contents of the aft and bulk cargo compartment.</p>
<p>Yellow Zone corner points</p> <p>N 23 59' 12" E 119 39' 48"</p> <p>N 23 59' 12" E 119 41' 00"</p> <p>N 23 57' 48" E 119 41' 00"</p> <p>N 23 57' 48" E 119 39' 48"</p>	<p>The Yellow Zone covers an area of approximately 1.8 square nautical miles (1.5 NM X 1.2 NM). This zone was generally referred to as the MWF.</p> <p>The wreckage found in the Yellow Zone: Sections 41, 42, 44 and part of Section 46, cockpit with instrument panels, both wings and wing flight control surfaces, wing center section, nose and wing landing gears, left body gear, forward cargo compartment door and part of the four struts attached to the wings. Most of the submerged victims' bodies were recovered in this zone.</p>
<p>Green Zone corner points</p> <p>N 23 57' 48" E 119 41' 00"</p> <p>N 23 57' 48" E 119 36' 00"</p> <p>N 23 54' 30" E 119 36' 00"</p> <p>N 23 54' 30" E 119 41' 00"</p>	<p>The Green Zone covers an area of approximately 13.5 square nautical miles (3.3 NM X 4.1 NM). This zone is ahead of the flight path.</p> <p>The wreckage found in the green zone: all four engines with part of the struts attached to each engine, engine cowls and various engine components. The right body gear was tangled with fishing nets.</p>
<p>Blue Zone corner points</p> <p>N 24 01' 15" E.119 38' 00"</p> <p>N 24 01' 15" E.119 39' 50"</p> <p>N 23 57' 48" E 119 39' 50"</p> <p>N 23 57' 48" E 119 38' 00"</p>	<p>The Blue Zone covers an area of approximately 6.5 square nautical miles (3.6 NM X 1.8 NM). This zone is directly west of and adjoins the red zone. Although targets were initially identified in the blue zone, no wreckage was recovered from this area.</p>

The relative position of the wreckage vs. the location of the accident aircraft is shown in Figure 1.18-14

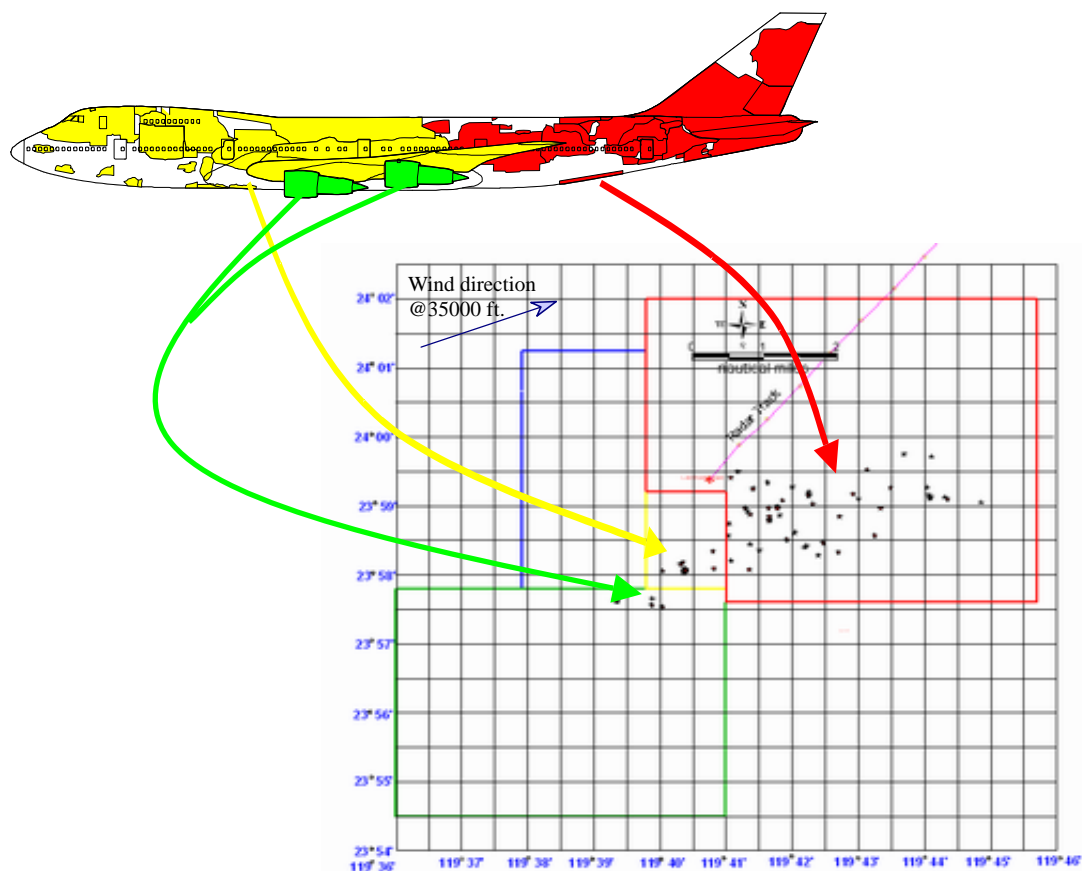


Figure 1.18-14 Divers within areas that were divided into four distinct zones retrieved the majority of the wreckage. These were color-coded red, yellow, green, and blue

Once the wreckage was identified and marked, all data were fed into a CI611 database, and then integrated into the Geographic Information System (GIS).

During this phase, the mapping of the wreckage spread continued. The Navy, NORC team, TFRI, and AUSS were continuously performing the mapping tasks. The Navy used SSS to survey blue zone, the AUSS cooperated with both NORC (OR-1) and TFRI (See Figure 1.18-15) to perform high accuracy mapping of the area other than zone A. The initial mapping task was finished on July 7, when the AUSS completed its assignment. The underwater targets were checked point by point by the Jan Steen ROV and divers.



Figure 1.18-15 The TFRI survey ship

The achievements in this phase are as follows:

- (1) Recovered 78 victims' bodies.
- (2) Identified 401 potential underwater targets as indicated in Table 1.18-2.
- (3) Using Jan Steen's ROV to check some of the AUSS, Navy and NCOR targets. In general, the Navy targets were found to be more accurate.

Table 1.18-2 the potential underwater targets detected by each organization

ORGANIZATION	TARGET	MAPPING AREA
NAVY	68	A+BLUE
AUSS	225	A
NCOR	108	A+G

Up until July 21, Jan Steen had searched all the targets in the red zone and recovered some of the SEC 46 and SEC 48 wreckage widely scattered in the red zone. However, the amount of recovered SEC 46 wreckage was still low. In order to find the remaining SEC 46 wreckages, the ASC Recovery group determined to expand the Red Zone, called it Zone A2. According to the radar data and the recovery of a human body by a fishing boat around the northeast corner of the Blue Zone, the SEC 46 debris could be in the north or east of the Red Zone. Therefore, the ASC Recovery group also decided to expand the Blue Zone, called it Zone B2. See Figure 1.18-16 for a map of Zone A2 and B2.

The area of Zone A2 was 54 square NM:

24°06'N, 119°47'E 24°06'N, 119°41'E

23°57'N, 119°41'E 23°57'N, 119°47'E

The area of Zone B2 was 51 square NM:

24°4.5'N, 119°41'E 24°4.5'N, 119°35'E

23°56'N, 119°35'E 23°56'N, 119°41'E

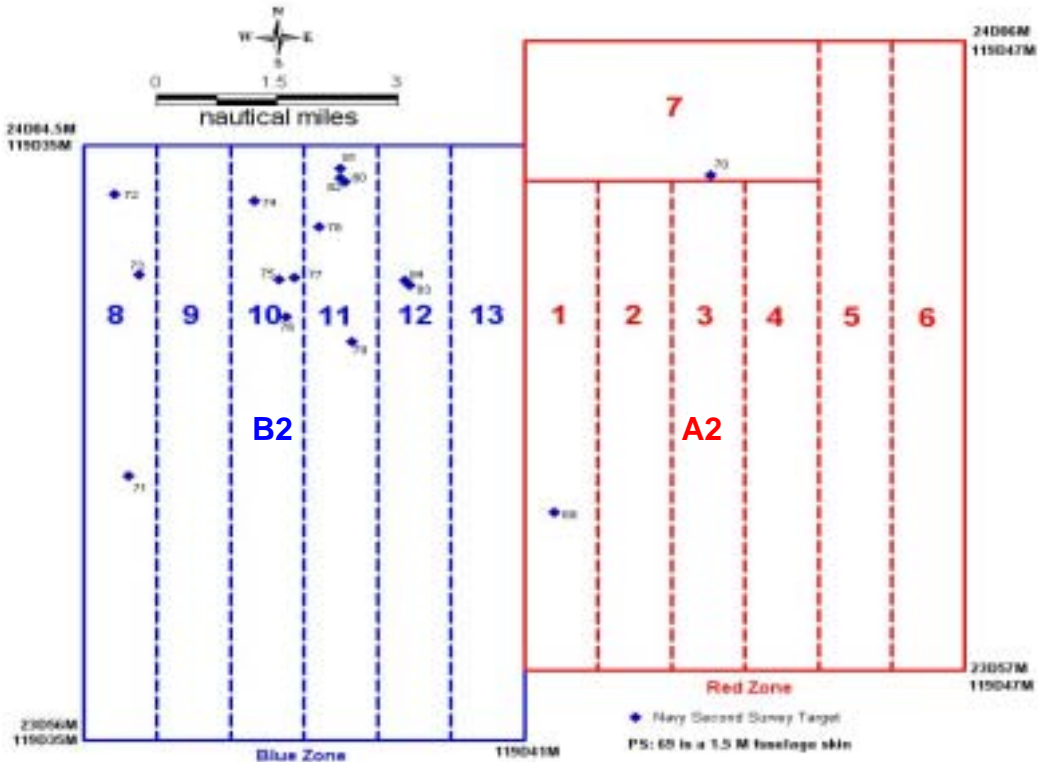


Figure 1.18-16 The Navy survey area in the 3rd phase and the underwater targets location

Because the accuracy of the targets identified by the Navy were more satisfactory, ASC requested Navy to provide additional support. There were two periods, July 29 to August 2 and August 9 to August 10 for additional Navy mapping activities. Throughout this period, the Navy provided 3 Under Water Research vessels. The following were the specifications of this operation: (1) scan radius of sonar: 250 yard, (2) overlap scan area: 50 yard, (3) cruise speed: 3~5 NM/hr. At the end of the operation, the Navy identified 16 new potential targets (Navy69-84).

On July 21, 2002, Jan Steen moved to the green zone and then recovered some heavy wreckage, including #2 engine, #3 engine, some engine part, and R/H body landing gear. On July 29 Jan Steen departed for the Yellow Zone, stayed there for 20 days, and recovered wreckage pieces of the SEC 41, SEC 42, and SEC 44.

After the Navy completed the underwater targets survey in Zone A2 and B2,

Jan Steen began to search for the new potential targets identified by the Navy. However, only a small piece of fuselage skin of 1.5m*1.5m was recovered at the target Navy-69. Jan Steen did not find any wreckage in the rest of the newly identified potential targets.

As the days went by and the recovery of the Section 46 was still not satisfactory, the Recovery Group evaluated the possibility of adding other recovery resources. The Northeast monsoon usually affects the weather in Penghu area in winter. When it comes, the average wind velocity would reach 22~27 knots that could seriously hamper the recovery operation. In order to complete the recovery operation before winter, the Recovery Group considered adding other recovery resources to accelerate the progress of the recovery operation.

One proposal was to hire a domestic recovery team, it failed because the domestic industries do not possess adequate recovery equipment. The other was to hire a foreign ship with ROV and more accurate side-scan sonar. It also failed because the ASC could not acquire budget to support this proposal. Thus, the ASC Recovery group decided to survey the area using the ROV sonar from Jan Steen. The search operations would focus on the Red zone, where the remaining of the Section 46 wreckage was more likely to be found.

This operation began on August 20 and lasted through September 15. Because the scan radius of the ROV sonar is shorter than a side or forward scans sonar, it was necessary to focus on a specific area of higher probability to detect the SEC 46 wreckage. The Recovery Group defined the survey area by comparing the radar data with the positions of the recovered SEC 46 wreckage, and to the areas where multi-targets concentrated resided, as shown in Figure 1.18-17. The following were the specifications of this operation: (1) scan radius of sonar: 40m, (2) overlap scan area: 5m, (3) cruise speed:3 NM/hr.

Divers and the ROV from Jan Steen were successfully recovered 35 pieces of wreckage. Most of them belong to the SEC 46 and SEC 48, such as vertical fin, upper rudder, cabin door, 5R door, part of fuselage skins, and structure components.

At the end of this phase, the command post was then de-commissioned. From August 15 to 25, all of the wreckage recovered was transported from Makung to TAFB Hangers.

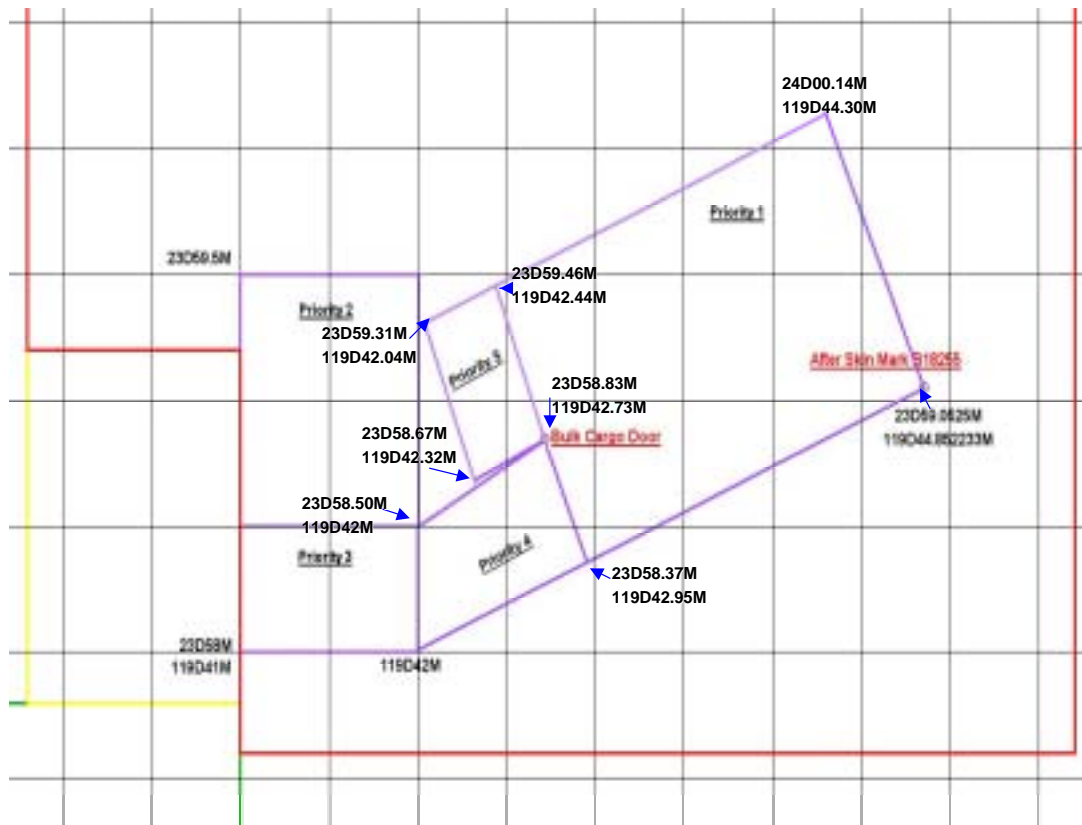


Figure 1.18-17 the survey area of ROV sonar working with Jan Steen

1.18.3.5 Phase IV Operation

In Phase III, Jan Steen had detected several wreckage pieces using ROV sonar, which implied some of the wreckages were not identified by the previous survey operation, and the remaining SEC 46 debris could still be in Zone A2. However, after recovering larger size wreckage, the use of divers and ROV to recover the remaining smaller wreckage pieces became difficult and ineffective. Shifting sand at seabed, tides, current, and typhoons caused many small pieces imbedded in the sand of the ocean floor. After careful consideration, the Recovery Group decided to use the trawling to complete the rest of the wreckage recovery.

The trawling operation was sponsored by China Airlines, both monetarily and in manpower. The CSIST team has experience in the recovery of a fighter aircraft wreckage through trawling. Therefore CSIST was hired by the China Airlines to provide technical supports. In the preparation stage, the CSIST installed Integrated Navigation System on each trawler [See Figure 1.18-18 (a)]. A control center was established on the 12th floor of the hotel where the

investigators resided (same building as the Makung Harbor Building) [See Figure 1.18-18 (b)]. The control center was equipped with functions such as GPS, track recording, trawling line management and real time position reporting. It assisted trawlers to navigate at sea and provided the Recovery Group to monitor the positions and tracks of the trawlers [See Figure 1.18-18 (c)].



Figure 1.18-18 (a) The CSIST personnel installed Integrated Navigation System on each trawler- upper-left photo, (b) the view of control center- lower photo, (c) a CSIST personnel used the Integrated Navigation System at control center- upper right photo.

Jan Steen continued working in the beginning of this phase, and ended its task on September 16. The trawling operation began on September 20, and lasted until October 17. Five commercial trawlers were hired for this task (See Figure 1.18-19) . Planned working time was 7 days, 24 hours per day. All trawlers were equipped with winch with maximum lift weight of 2,000 kg. One barge and one tugboat were hired for temporary wreckage storage and transportation.

The following were the specifications of the trawling net: (1) net dimension: 5m*12m, 10m wide normal to the trawling direction, (2) material: f double strength nylon (3) net hole dimension: 10cm*10cm, (4) depth of penetration into the sea bed: 5cm normally, depending on trawling speed and hardness of the sea bed, (5) Maximum water depth of operation: 100m.

Based on radar data, the positions of recovered wreckage and the survey data, the Recovery Group specified the trawling operation area where most of the SEC 46 debris was located. The trawling area covered was 21 square nautical miles, and divided into 5 smaller zones (zone A3 to E3) (See Figure 1.18-20). Track spacing was 10m and trawling direction was North-South. Each trawler was assigned to one zone. While a boat cruised against the current, it would maintain its speed between 2 to 3 knots, and 3 to 4 knots in reversed direction.



Figure 1.18-19 the commercial fishing boats in the trawling operation
Coordinates of each zone were shown in Table 1.18-3.

Table 1.18-3 Coordinates of each zone

A3	N 23	58' 00"	E 119	40' 00"
	N 24	00' 30"	E 119	40' 00"
	N 24	00' 30"	E 119	41' 00"
	N 24	01' 30"	E 119	41' 00"
	N 24	01' 30"	E 119	41' 18"
	N 23	58' 00"	E 119	41' 18"
B3	N 23	58' 00"	E 119	41' 18"
	N 24	00' 30"	E 119	41' 18"
	N 24	00' 30"	E 119	42' 30"
	N 23	58' 00"	E 119	42' 30"
C3	N 23	58' 00"	E 119	42' 30"
	N 24	00' 30"	E 119	42' 30"
	N 24	00' 30"	E 119	43' 45"
	N 23	58' 00"	E 119	43' 45"
D3	N 23	58' 00"	E 119	43' 45"
	N 24	00' 30"	E 119	43' 45"
	N 24	00' 30"	E 119	45' 00"
	N 23	58' 00"	E 119	45' 00"
E3	N 23	58' 00"	E 119	45' 00"
	N 24	01' 30"	E 119	45' 00"
	N 24	01' 30"	E 119	46' 00"
	N 24	00' 00"	E 119	46' 00"
	N 24	00' 00"	E 119	46' 30"
	N 23	58' 00"	E 119	46' 30"

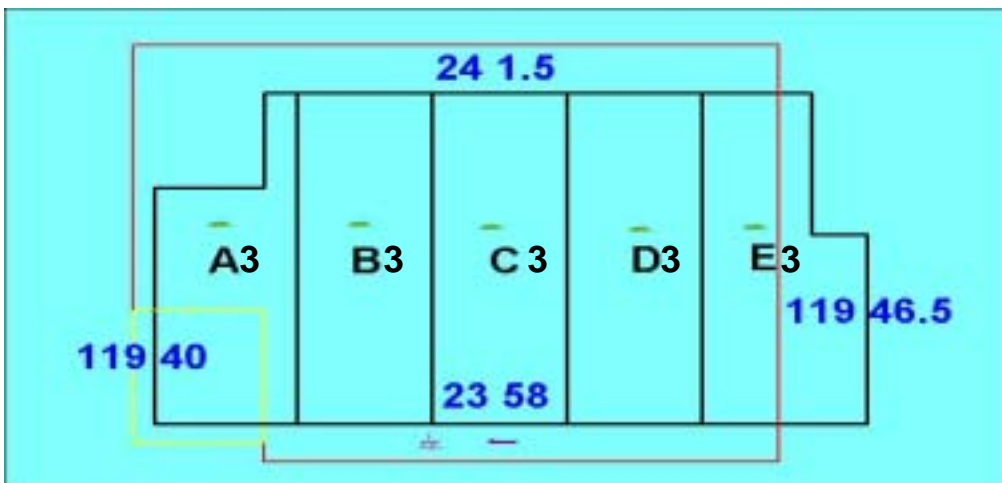


Figure 1.18-20 the trawling operation area

Throughout the trawling operation, the Northeast monsoon had begun to affect the weather in Penghu area. The operations were suspended several times due to bad weather. As the result of the trawling operation, a totally of 97 pieces of wreckage were recovered, most were structure and system parts. This effort was completed on October 17, 2002, thus ending the recovery operation.

1.18.3.6 Wreckage Handling and Transportation

The CI611 wreckage was transported from Makung to Taoyuan Air Force Base (TAFB) Hanger #1 and Hanger #2 to allow for the follow-on wreckage reconstruction activities and for storage of the wreckage in one location. The wreckage was initially transferred by barge from two locations within the Makung Harbor to a port near Taoyuan where it was offloaded onto trucks. The wreckage was then transported by trucks to the hangers at TAFB where the red zone wreckage and other Section 46 structure was placed in Hanger 2 and all other wreckage was stored in Hanger 1.

A shipping size limitation of 8m x 20m x 2.9m was established to accommodate the trucks used for road transportation and to clear obstacles during the ground transportation of the wreckage. This limitation required that some of the wreckage be cut into smaller sections prior to transportation to the hanger.

- Item 626 (fuselage skin from STA 800 to STA 1540) was cut into 5 sections that were retagged as items 626C1 through 626C5.
- Item 546 (left fuselage STA 940 to STA 1415 including the left wing gear) was cut into 2 sections that were retagged as items 546C1 and 546C2.
- Item 628 (right wing lower panel) was cut into 2 sections that were retagged as items 628C8 and 628C9.
- Item 526 (right wing upper panel) was cut into 4 sections that were retagged as items 526C1 through 526C4.
- Item 547 (left wing) was cut into 3 sections that were retagged as items 547C1 through 547C3
- Item 630 (Section 48 and Empennage) was cut into 4 sections and the vertical fin, left horizontal stabilizer, and right horizontal stabilizer

were retagged as 630C1 through 630C3 respectively.

All of the wreckage was cut at Makung prior to the barge transportation except for the empennage item 630, which was cut at the Port of Taipei prior to transportation by truck to the TAFB. Figure 1.18-21 shows the shipping of the wreckage by trucks.

In March 2003, the Wreckage Recovery/Transportation Group was informed there was wreckage be recovered by the fishing boats from Mainland China. After reviewed of the photos sent to the ASC, it was identified that those are indeed the CI611 wreckage. Attempt was made to transport the wreckage from Mainland China to TAFB. On April 16, 2003, the wreckage arrived TAFB and placed in Hanger #2.



Figure 1.18-21 shows the shipping of the wreckage by trucks

1.18.3.7 Wreckage Tagging and Master Wreckage Database

1.18.3.7.1 Wreckage Tagging

As wreckage was recovered and brought to Makung, each large piece of wreckage was assigned a unique identifying number and a tag was attached to the part. Each piece of wreckage from the red zone was assigned a separate tag. In some cases, small pieces of wreckage that were recovered en masse from the MWF were tagged collectively by the box. Some of those items were

later given individual tags after examination by the investigators. Each tag had the wreckage ID number with the recovery longitude and latitude location written on the tag. During the initial recovery stages, various types of tagging material were used but later, a coated canvas material was selected for its durability. These tags were colored yellow, red, or green based on the zone that particular wreckage piece was recovered. A white tag was attached to those parts for which a recovery location was not known, such as the pieces recovered by the fishing boats.

Tags were also applied to wreckage at the TAFB hangers when pieces of wreckage of potential interest were examined that did not have tags currently assigned, typically for parts that had become separated from each other during transportation.

During trawling operation, wreckage tagging was accomplished in Makung harbor. Because of the nature of the trawling operation, no precise recovery location was known. Instead, the recovery date and boat number was recorded on the tag. Since each trawling boat was assigned to a specific trawling zone, the boat number would correspond to one specific trawl zone. For instance, boat 1 designated wreckage recovered from zone A3, boat 2 designated wreckage recovered from zone B3, and so on. If needed, the trawling tracing records could be interrogated to help narrow the location of the recovered components.

1.18.3.7.2 Master Wreckage Database

The Master Wreckage Database was developed using an Excel spreadsheet that contained known data on each piece of data that was tagged. The various data fields for each piece of wreckage allowed for data sorting capabilities later in the investigation and have been merged into the CI611 Database. The Master Wreckage Database containing 719 larger pieces of the wreckage recovered is shown in Appendix 3-1.

1.18.3.8 Summary

As a whole, the entire wreckage recovery operation for CI611 accident investigation lasted nearly 5 months, recovered approximately 1,500 pieces, and 78 bodies. After combining all the survey sources and the wreckage recovery locations, the wreckage map is shown in Figure 1.18-22. There are

still 50 bodies and a major portion of the Section 46 remained uncovered.

CI-611 Wreckage Distribution

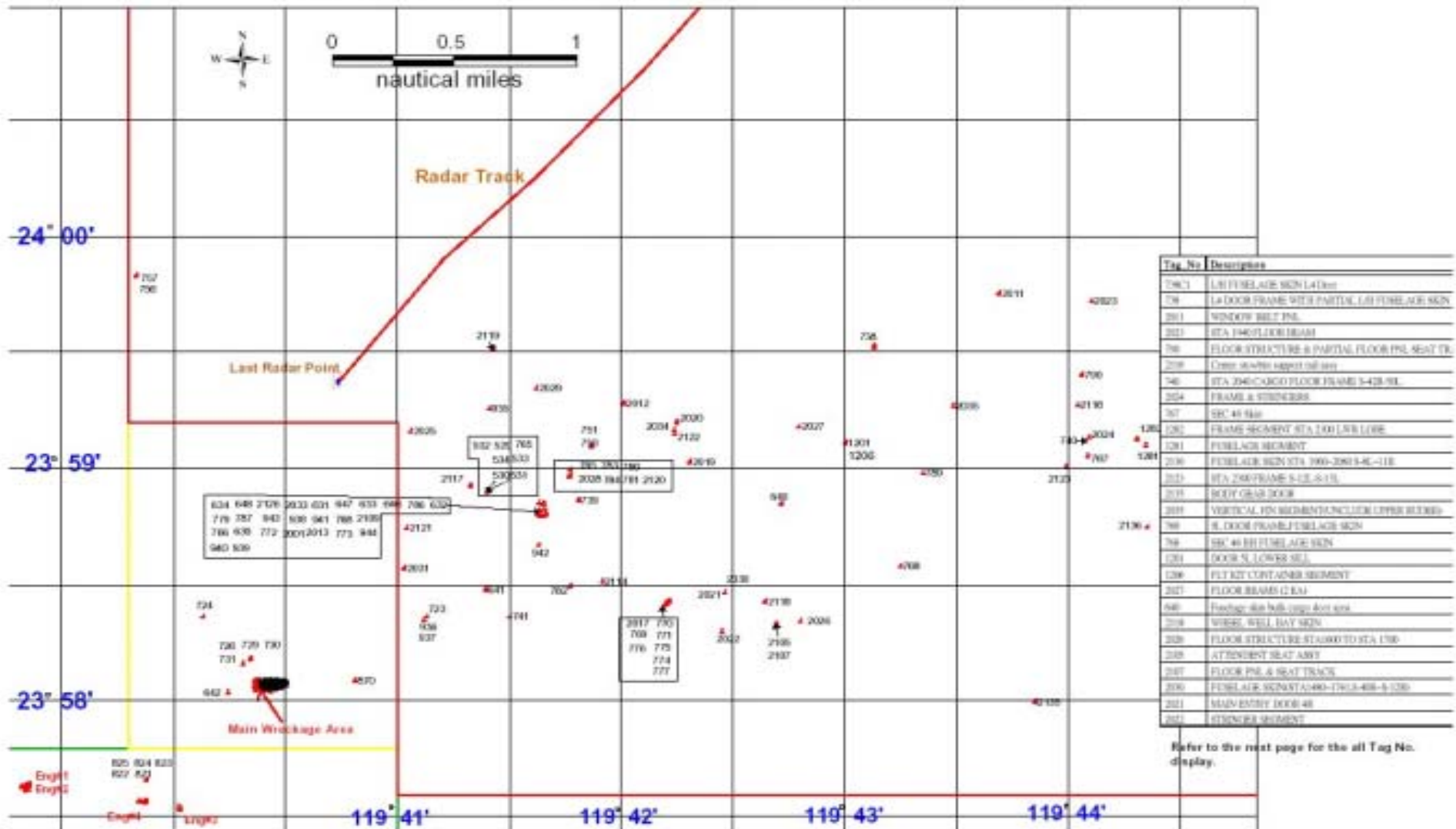


Figure 1.18-22 The wreckage map

IV. Appendix

3-1 Recovered Major Wreckage Database for the CI611 Accident

Recovery ID	Recovery Date	Recovery Unit	Recovery Method	SONAR RELATED TARGET	System ID (Tag No)	ZONE	Wreckage Description	Latitude	Longitude
B1	06/12/02	YA-TI	DIVER	NAVY-31	487	YELLOW	Upper Deck Skin Panel	23.96798	119.67292
B2	06/13/02	YA-TI	DIVER	NAVY-31	526	YELLOW	R/H Wing Upper Skin	23.96797	119.67287
A1	06/18/02	Global	DIVER	NAVY-56		RED	CVR	23.98290	119.69400
A2	06/19/02	Global	DIVER	NAVY-59, SA194L		RED	FDR	23.98290	119.68800
C1	06/21/02	YA-TI	DIVER	NAVY-19, SA084L, 3402p	550	GREEN	#4 Engine	23.95943	119.66448
B3	06/22/02	Global	DIVER	NAVY-31	545	YELLOW	Cockpit	23.96788	119.67280
B4	06/23/02	Global	DIVER	NAVY-32	546	YELLOW	L/H wing landing gear, L3 DR	23.96775	119.67292
C2	06/26/02	YA-TI	DIVER	NAVY-20	580	GREEN	#1 Engine-Fan Cowling	23.96075	119.65588
B5	06/27/02	Global	DIVER	NAVY-32	547	YELLOW	L/H Wing	23.96775	119.67283
C3	06/27/02	YA-TI	DIVER	4202p	617	GREEN	#1 Engine	23.96037	119.65587
B6	06/28/02	Global	DIVER		625	YELLOW	R/H Fuselage ,14m*10m,STA 800-1350	23.96782	119.67287
B8	06/28/02	Global	DIVER			YELLOW	FWD cargo DR	23.96734	119.67283
B7	06/29/02	Global	DIVER	NAVY-32	526	YELLOW	R/H Wing	23.96782	119.67287
B48	06/29/02	Global	DIVER			YELLOW	Fuselage Skin	23.98636	119.69038
B49	06/29/02	Global	DIVER			YELLOW	MOUNTING BRACKET FOR ELECTRICAL COMPONENT	23.98746	119.69054
A3	06/30/02	Global	DIVER	NAVY-8, NAVY-12, NAVY-29,	630	RED	Tail	23.98013	119.69400

				NAVY-34, NAVY-35, NAVY-42					
A4	06/30/02	Global	DIVER	SA055L	647	RED	Skin Section 46 aft portion	23.97997	119.69425
A62	06/30/02	Global	DIVER	SA055L		RED	Small debris	23.98013	119.69400
A5	07/01/02	Global	DIVER	NAVY-10, SA047L, SA323L, SA036, SA052L	640	RED	Bulk Cargo DR	23.98085	119.71190
B9	07/01/02	Global	DIVER		639	YELLOW	L/H STA 1320-1620 , WCS upper panel	23.96759	119.67271
B10	07/02/02	Global	DIVER	NAVY-31	650	YELLOW	Fuselage Skin with R1 DR	23.96785	119.67275
B11	07/02/02	Global	DIVER	NAVY-2	652	YELLOW	Fuselage R/H Skin STA400-500	23.96759	119.67271
B12	07/02/02	Global	DIVER	NAVY-2	649 717	YELLOW	Nose landing gear assy	23.96759	119.67271
B13	07/02/02	Global	DIVER	NAVY-2	652 656	YELLOW	Section 41 Frame & interior component	23.96759	119.67271
B14	07/07/02	Global	DIVER	SA082L	728	YELLOW	Aft L1 DR, Section 42 L/H fuselage,4m	23.96775	119.67291
B15	07/07/02	Global	DIVER	NAVY-32	725	YELLOW	The component connect L/H wing and fuselage	23.96775	119.67291
B16	07/07/02	Global	DIVER	NAVY-32	726	YELLOW	Wing upper skin	23.96975	119.67236
A6	07/08/02	Global	DIVER	SA237L, NAVY-47, SA301L, 6601p, SA261L, 6501p	723	RED	aft cargo door upper	23.97272	119.68553
B17	07/08/02	Global	DIVER	NAVY-23, SA442	724	YELLOW	WCS Front Spar	23.97272	119.66886
B18	07/08/02	Global	DIVER	SA270L	731	YELLOW	Fuselage Skin Section 42(STA520-620)	23.96932	119.67177
A7	07/12/02	Global	DIVER	NAVY-66, NAVY-58, NAVY-15, NAVY-28, NAVY-30, SA232L, SA303L	741	RED	aft cargo door lower ball transfer panel with partial door attach(5m*4m*0.5m)	23.97272	119.69169
A10	07/13/02	Global	DIVER	SA289L, SA032L	767	RED	Small piece 30cm x 20cm with STA1900 written	23.98525	119.73467
A8	07/13/02	Global	DIVER	NAVY-1, NAVY-63	739	RED	Seat Track(1.5m*0.2m*0.3m)	23.98110	119.69683

A9	07/13/02	Global	DIVER	NAVY-16	740	RED	After Cargo DR under floor frame (2m*0.5m)	23.98535	119.73460
A11	07/14/02	Global	DIVER	NAVY-9	738	RED	Large piece fuselage 10m*5m with door frame STA1460 included (L4 DR forward 3 Windows , back 10 Windows)	23.99210	119.71879
A63	07/14/03	Global	DIVER	NAVY-9		RED	Two Seat(E class)	#VALUE!	119.69806
A12	07/15/02	Global	DIVER	NAVY-41,NAVY-36	Not Recovered	RED	Cargo Container	23.98330	119.69616
A13	07/15/02	Global	DIVER	NAVY-43	780 781 783 784	RED	Galley	23.98330	119.69616
A14	07/15/02	Global	DIVER	NAVY-44, 7001p	751	RED	L5 door, Section 46,8m*2m	23.98496	119.69772
A64	07/15/03	Global	DIVER	NAVY-44, 7001p		RED	Cargo Container Wreckage	23.98491	119.69616
A15	07/17/02	Global	DIVER	7004p	944	RED	R/H side of Section 48 skin with portion of STA 2460 frame	23.98012	119.69400
A16	07/17/02	Global	DIVER	NAVY-48, 7002p	765	RED	Access DR	23.98043	119.69430
A17	07/17/02	Global	DIVER	NAVY-65	935	RED	Button Skin, 2m*3m	23.98013	119.69400
A18	07/18/02	Global	DIVER	SA044L, SA046L	776	RED	Lower cargo floor frame	23.97383	119.70359
A65	07/18/03	Global	DIVER	SA044L, SA046L	775	RED	Lower Cargo Deck Section	23.97386	119.70341
A19	07/19/02	Global	DIVER	SA001, SA035	768	RED	Skin with 11 windows near the R4 DR, STA 1680-1930, 3m high	23.97636	119.72076
A20	07/20/02	Global	DIVER	SA008L, SA288L	767	RED	AFT skin mark B18255, 6m*2.5m	23.98424	119.73476
A21	07/20/02	Global	DIVER	SA281L, SA286L	790	RED	main deck floor above bulk CAG comp. STA1980-2040, 2m*1m	23.99010	119.73434
A22	07/21/02	Global	DIVER	SA292L, SA295L	789	RED	Skin STA 2230-2340	23.98302	119.72245
C4	07/25/02	Global	DIVER	1702p	792 793 794 795	GREEN	#2 ENGINE PARTS	23.96045	119.65562

					796					
C5	07/26/02	Global	DIVER	1501p	797 799 801	798 800	GREEN	#2 Engine Parts	23.96058	119.65531
C6	07/27/02	Global	DIVER	SA401L	814 816 818	815 817 819	GREEN	ENGINE PARTS	23.95897	119.66717
C7	07/27/02	Global	DIVER	3401p	806		GREEN	#3 Engine	23.95897	119.66717
C8	07/27/02	Global	DIVER	NAVY-18	821		GREEN	R/H Body Landing Gear	23.96104	119.66466
B19	07/29/02	Global	DIVER		830		YELLOW	L/H Body Landing Gear	23.96769	119.67299
B20	07/29/02	Global	DIVER		831		YELLOW	Wing landing gear beam(10m*2m)	23.96769	119.67299
B21	07/29/02	Global	DIVER	NAVY-32	829		YELLOW	Right Wing Landing Gear	23.96769	119.67299
B23	07/29/02	Global	DIVER				YELLOW	2 unknow Wreckage (2m, 1.7m)	23.96767	119.67300
B24	07/29/02	Global	DIVER	NAVY-32	843		YELLOW	Fuselage skin with 5 windows about STA320	23.96769	119.67299
B25	07/29/02	Global	DIVER	NAVY-32	835		YELLOW	Section 42 AFT floor (3.8m*1.2m) Part of wing box (1.7m*1.7m)	23.96769	119.67299
B26	07/29/02	Global	DIVER	NAVY-32	837		YELLOW	Center bulkhead (6m*0.8m) Part of wing skin (2.2m*1m)	23.96769	119.67299
B27	07/29/02	Global	DIVER	NAVY-32			YELLOW	One baseket wreckage	23.96772	119.67293
B28	07/29/02	Global	DIVER	NAVY-32	893		YELLOW	Flap track without flap	23.96779	119.67287
B29	07/29/02	Global	DIVER	NAVY-32			YELLOW	Part of wing skin (2m*1.5m)	23.96777	119.67290
B30	07/29/02	Global	DIVER	NAVY-32			YELLOW	One baseket wreckage	23.96778	119.67293
B31	07/30/02	Global	DIVER	NAVY-32			YELLOW	Stiffner*3 (3m), Part of tank (2m*1.5m)	23.96772	119.67285

B32	07/30/02	Global	DIVER	NAVY-32	868	YELLOW	Main entry door (s/n 000710)	23.96769	119.67299
B33	07/30/02	Global	DIVER	NAVY-32	832	YELLOW	Flap track with partial flap*2 (1.6m*1.6m, 1.1m*0.7m)	23.96769	119.67299
B34	07/30/02	Global	DIVER	NAVY-32		YELLOW	Stiffner*2 (3m&2m), Part of tank	23.96780	119.67293
B35	07/31/02	Global	DIVER			YELLOW	Spoiler	23.96787	119.67315
B36	07/31/02	Global	DIVER		831	YELLOW	Main Landing Gear Component	23.96769	119.67299
B37	07/31/02	Global	DIVER			YELLOW	Outboard Wing Section	23.96780	119.67315
B38	08/01/02	Global	DIVER	6301p	870	YELLOW	Engine Pylon	23.96822	119.68020
B39	08/01/02	Global	DIVER		879	YELLOW	FLAP TRACK WITH FLAP AND JACKSCREW	23.96769	119.67299
B52	08/01/02	Global	DIVER	SA225L, SA233L	869	YELLOW	Leading Edge Flap	23.96766	119.67301
B57	08/01/02	Global	DIVER	SA225L, SA233L	873	YELLOW	Leading Edge Flap	23.96766	119.67301
B58	08/01/02	Global	DIVER	SA225L, SA233L	872	YELLOW	Flap Track with Jack Screw	23.96766	119.67301
B59	08/01/02	Global	DIVER	SA225L, SA233L	877	YELLOW	FLAP TRACK WITH JACK SCREW AND L/E WING RIB 65B14991-1	23.96766	119.67301
B40	08/01/02	Global	DIVER			YELLOW	Wing strainer, part of wing skin,+nose skin, Moveable falinkage, air condition duct system	23.96780	119.67305
B60	08/01/02	Global	DIVER		885	YELLOW	T/E Flap with track and flap	23.96788	119.67316
B41	08/02/02	Global	DIVER	NAVY-32	880	YELLOW	Pressure relieve valve, Partial center tank	23.96778	119.67287
B42	08/02/02	Global	DIVER	NAVY-32		YELLOW	Wing Strainer, Body frame, Nose skin,	23.96780	119.67290
B61	08/02/02	Global	DIVER	NAVY-32	898	YELLOW	L/E KRUNGER INBD FLAP 6539200-5	23.96780	119.67290
B62	08/02/02	Global	DIVER	NAVY-32	871	YELLOW	DIAGONAL BRACE WITH PYLON	23.96779	119.67287
B63	08/02/02	Global	DIVER	NAVY-32	875	YELLOW	Cockpit EMG DR	23.96788	119.67303

B64	08/02/02	Global	DIVER	NAVY-32	925	YELLOW	R/H upper wing skin	23.96779	119.67287
B65	08/02/02	Global	DIVER	NAVY-32	876	YELLOW	FuselageSkin	23.96780	119.67299
B43	08/02/02	Global	DIVER	NAVY-32	906	YELLOW	Wing Skin	23.96777	119.67282
B44	08/02/02	Global	DIVER	NAVY-32	865	YELLOW	Fuselage Skin	23.96775	119.67268
B45	08/02/02	Global	DIVER	NAVY-32	883	YELLOW	Galley part	23.96772	119.67277
B46	08/03/02	Global	DIVER		916	YELLOW	Flap with track	23.96785	119.67310
B47	08/03/02	Global	DIVER		911	YELLOW	Fuselage skin with 2L DR and 5windows	23.96772	119.67290
A59	08/10/02	Global	DIVER	NAVY-69	935	RED	Fuselage skin piece (1.5m)	23.98762	119.69012
A60	08/12/02	Global	DIVER	SA306L, SA311L, SA317L		RED	Small wreckage piece	23.98623	119.71535
B50	08/14/02	Global	DIVER			YELLOW	Section 42 : Lower fuselage skin*2 (6*5ft , 8*5ft) Main fuel tank frame (8*4ft)	23.96772	119.67285
B66	08/14/03	Global	DIVER		969	YELLOW	Section 42 lower skin	23.96800	119.67294
B67	08/14/03	Global	DIVER		970	YELLOW	Section 42 skin panel	23.96810	119.67284
B51	08/17/02	Global	DIVER	3801p		YELLOW	One baseket wreckage, Wing Section (10*2ft), Kruger flap (7*4ft)	23.96810	119.67263
B68	08/17/02	Global	DIVER	3801p	1016	YELLOW	Outboard leading edge flap	23.96807	119.67326
B69	08/17/02	Global	DIVER	3801p	1017	YELLOW	Fuselage Skin (Section 42,STA800~940)	23.96811	119.67264
A61	08/17/02	Global	DIVER			RED	One box of wreckage piece, a piece of skin	23.96797	119.68918
B53	08/17/02	Global	DIVER	NAVY-31		YELLOW	Wing section (10*3ft), Fuselage skin (15*2ft), W/W panel (4*3ft), Galley bottom panel (6*3ft), L/E Kurger flap (4*3ft), W/W panel (7*3ft), #1 R/H Door	23.96788	119.67285
B54	08/18/02	Global	DIVER	SA270aL		YELLOW	Kruger flap (10*15ft), L/E flap (3*1ft), T/E flap (6*4/ 11*6/ 8*2/	23.96807	119.67325

							6*5/ 7*25ft)		
B55	08/18/02	Global	DIVER			YELLOW	Inboard Trailing Edge Flap	23.96775	119.67294
B70	08/18/02	Global	DIVER		1203	YELLOW	FWD Cargo DR (10*6ft)	23.96779	119.67326
B71	08/18/02	Global	DIVER		1211	YELLOW	Wing piece	23.96779	119.67326
B72	08/18/02	Global	DIVER		1223	YELLOW	Pylon	23.96775	119.67294
A23	08/19/02	Global	DIVER	SA192L, SA204L		RED	Skin 1.5m*1.5m	23.98747	119.69008
B56	08/19/02	Global	DIVER	NAVY-32	1204	YELLOW	Fuselage Skin STA 880-1000 (11*6ft)	23.96775	119.67294
B73	08/19/03	Global	DIVER	NAVY-32	1202	YELLOW	Fuselage Skin STA 700~760	23.96775	119.67294
B74	08/19/03	Global	DIVER	NAVY-32	1257	YELLOW	Wing Fuel Tank Skin	23.96775	119.67294
B75	08/19/03	Global	DIVER	NAVY-32	1264	YELLOW	Wing Fuel Tank Skin	23.96775	119.67294
A24	08/20/02	Global	ROV			RED	Skin STA 1940-2040, 8ft*4ft	23.98523	119.71668
A25	08/24/02	Global	ROV		1282	RED	Portion of Frame	23.98547	119.73843
A26	08/24/02	Global	ROV		1281	RED	Section 46 skin 4m*1.7m	23.98502	119.73909
A27	08/25/02	Global	ROV		2024	RED	Frame & Stringer	23.98558	119.73482
A28	08/25/02	Global	ROV			RED	2m Frame	23.98607	119.73432
A29	08/26/02	Global	ROV		2116	RED	Support beam	23.98789	119.73398
A30	08/27/02	Global	ROV		2035	RED	Vertical Fin & Upper Rudder	23.98781	119.72473
A31	08/30/02	Global	ROV		2011	RED	L/H Section 46 Skin with 9 windows, STA 1900-2080	23.99591	119.72815
A32	08/31/02	Global	ROV		2119	RED	Cargo Container*2	23.99188	119.69046
A33	08/31/02	Global	ROV		2029	RED	Cargo Container	23.98910	119.69368
A34	08/31/02	Global	ROV		2012	RED	3.5m*2m section 46 Skin, STA 2180-2320	23.98806	119.70019

A35	09/02/02	Global	ROV		2120	RED	Cargo Container skin	23.98296	119.69617
A36	09/02/02	Global	ROV		2028	RED	Cargo Container skin, AKE61418C1	23.98278	119.69614
A37	09/02/02	Global	ROV		2109	RED	2m Stringer & 1m*0.5m skin	23.98082	119.69415
A38	09/02/02	Global	ROV		2121	RED	2 pieces of panel (10cm*20cm)	23.97908	119.68405
A39	09/02/02	Global	ROV		2117	RED	Piece of Cargo Container	23.98215	119.68871
A41	09/03/02	Global	ROV		2031	RED	Piece of Stringer	23.97622	119.68385
A42	09/03/02	Global	ROV		2114	RED	Piece of Stringer	23.97523	119.69858
A46	09/10/02	Global	ROV		2019	RED	After Cargo DR Restriction (79in*39in)	23.98388	119.70512
A47	09/10/02	Global	ROV		2034	RED	Station2200,5R DR	23.98612	119.70392
A48	09/10/02	Global	ROV		2020	RED	DR, not identified	23.98667	119.70412
A47	09/11/02	Global	ROV		2030	RED	Station1480~1741 Fuselage Skine with DR	23.97450	119.70773
A48	09/11/02	Global	ROV		2017	RED	Frame	23.97382	119.70353
A51	09/11/02	Global	ROV			RED	Frame	23.97152	119.70653
A52	09/11/02	Global	ROV			RED	Frame	23.97442	119.70768
A53	09/12/02	Global	ROV			RED	Frame	23.97700	119.70062
A54	09/13/02	Global	ROV			RED	Cargo Loading Pannel (2.3m*2.3m)	23.97382	119.70353
A55	09/13/02	Global	ROV			RED	Cabin Floor (Station 1600~1720) 3.4m*3.2m	23.97243	119.67997
A56	09/13/02	Global	ROV		2105	RED	The Seat of Crew Member	23.97218	119.71148
A57	09/14/02	Global	ROV			RED	Hydraulic Tube	23.97408	119.68930
A58	09/15/02	Global	ROV		2023	RED	Cabin floor 3m*0.55m	23.99536	119.73508
T1		BOAT #5	TRAWLING		2014	RED	STA 2060 FRAME		

T2	10/02/02	BOAT #8	TRAWLING		2103	RED	FRAME SEGMENT		
T3		BOAT #8	TRAWLING		2128	RED	HORIZONTAL STABILIZER RIB		
T4	10/18/02	BOAT #2	TRAWLING		2129	RED	FLOOR BEAM		
T5		BOAT #2	TRAWLING		2131	RED	WING SPAR		
T6	09/29/02	BOAT #1	TRAWLING		2132	RED	FUSELAGE SKIN		
T7		BOAT #8	TRAWLING		2133	RED	FUSELAGE SKIN		
T8	09/29/02	BOAT #8	TRAWLING		2134	RED	FUSELAGE SKIN STA 2040~1940 S-12L-8L		
T9	09/29/02	BOAT #1	TRAWLING		2137	RED	RBL WHEEL WEL STA 1240		
T10	10/18/02	BOAT #2	TRAWLING		2138	RED	STRINGER SEG		
T11	10/18/02	BOAT #2	TRAWLING		2139	RED	CGO CONTAINER TRACK		
T12	09/29/02	BOAT #5	TRAWLING		2140	RED	FUSELAGE SKIN STA 2020~2060 S5L~10L		
T13	09/29/02	BOAT #4	TRAWLING		2141	RED	STRINGER SEG		
T14	09/29/02	BOAT #5	TRAWLING		2142	RED	FRAME SEG		
T15	09/29/02	BOAT #5	TRAWLING		2143	RED	FRAME SEG		
T16		BOAT #5	TRAWLING		2144	RED	FRAME SEG		
T17		BOAT #5	TRAWLING		2145	RED	SEAT TRACK ON FLOOR BEAM		
T18		BOAT #5	TRAWLING		2146	RED	CGO ROLER TRACK		
T19	10/06/02	BOAT #3	TRAWLING		2147	RED	FRAME SEG		
T20		BOAT #5	TRAWLING		2148	RED	FLOOR BEAM STA 1740		
T21	09/27/02	BOAT #1	TRAWLING		2149	RED	WING RIB		
T22	09/28/02	BOAT #8	TRAWLING		2150	RED	FRAME SEG P/N:69B80680 SKETCH 10/06		

T23		BOAT #5	TRAWLING		2151	RED	DADO PNL		
T24		BOAT #3	TRAWLING		2152	RED	SEAT TRACK		
T25	09/27/02	BOAT #1	TRAWLING		2153	RED	FUSELAGE SKIN		
T26		BOAT #3	TRAWLING		2154	RED	FRAME WITH STRUCTURE SEG (SKETCHED 09/30)		
T27		BOAT #1	TRAWLING		2155	RED	FRAME SEG		
T28	09/27/02	BOAT #1	TRAWLING		2156	RED	T/E FLAP FIX PNL		
T29	10/06/02	BOAT #5	TRAWLING		2157	RED	FRAME SEG		
T30	09/29/02	BOAT #1	TRAWLING		2158	RED	FLOOR BEAM		
T31	09/29/02	BOAT #1	TRAWLING		2159	RED	RIB SEG		
T32		BOAT #1	TRAWLING		2160	RED	ACCESS PNL		
T33		BOAT #1	TRAWLING		2161	RED	SEAT TRACK		
T34	09/29/02	BOAT #3	TRAWLING		2162	RED	FRAME SEG STA 2260		
T35		BOAT #1	TRAWLING		2163	RED	STRINGER SEG		
T36		BOAT #5	TRAWLING	_	2164	RED	FLOOR BEAM STA 2164		
T37		BOAT #3	TRAWLING	_	2165	RED	FRAME SEG		
T38		BOAT #3	TRAWLING	_	2166	RED	WEB SEGMENT		
T39		BOAT #3	TRAWLING	_	2167	RED	FRAME SEG		
T40	10/13/02	BOAT #3	TRAWLING	_	2168	RED	STRUT T/E DOR		
T41		BOAT #1	TRAWLING	_	2169	RED	WING RIB STA WS.917		
T42		BOAT #1	TRAWLING	_	2170	RED	FUSELAGE SKIN		
T43		BOAT #1	TRAWLING	_	2171	RED	FUSELAGE SKIN		

T44		BOAT #1	TRAWLING	__	2172	RED	CHORD		
T45	10/18/02	BOAT #3	TRAWLING	__	2173	RED	FRAME SEG		
T46	10/18/02	BOAT #3	TRAWLING	__	2174	RED	SEAT TRACK		
T47	10/18/02	BOAT #3	TRAWLING	__	2175	RED	STRINGER SEG		
T48	10/18/02	BOAT #3	TRAWLING	__	2176	RED	FRAME SEG		
T49		BOAT #3	TRAWLING	__	2177	RED	FLOOR PNL ITH SEAT TRACK		
T50		BOAT #1	TRAWLING	__	2178	RED	FRAME & STRINGERS		
T51		BOAT #1	TRAWLING	__	2179	RED	FLAP RIB		
T52		BOAT #1	TRAWLING	__	2180	RED	COMP. SKIN		
T53		BOAT #1	TRAWLING	__	2181	RED	FUSELAGE SKIN & STRINGER		
T54	10/06/02	BOAT #3	TRAWLING	__	2182	RED	SUPPORT WITH RUD RATIO (65B83348)		
T55	10/06/02	BOAT #3	TRAWLING	__	2183	RED	FRAME CHORD		
T56	09/29/02	BOAT #5	TRAWLING	__	2184	RED	VERTICAL FIN RIB (STA 345)		
T57		BOAT #1	TRAWLING	__	2185	RED	FLAP RIB		
T58	10/18/02	BOAT #2	TRAWLING	__	2186	RED	CGO LOOR WITH FRAME		
T59		BOAT #3	TRAWLING	__	2187	RED	WING RIB		
T60	10/06/02	BOAT #5	TRAWLING	__	2188	RED	SEAT TRACK		
T61		BOAT #2	TRAWLING	__	2189	RED	STRINGER SEG		
T62		BOAT #2	TRAWLING	__	2190	RED	FUSELAGE SKIN		
T63		BOAT #2	TRAWLING	__	2191	RED	FUSELAGE SKIN		
T64	09/29/02	BOAT #5	TRAWLING	__	2192	RED	FUSELAGE SKIN(SKETCHED 09/30)		

T65		BOAT #8	TRAWLING	__	2193	RED	STRINGER ITH FUSELAGE		
T66	09/29/02	BOAT #8	TRAWLING	__	2194	RED	FRAME		
T67	10/18/02	BOAT #8	TRAWLING	__	2195	RED	FRAME SEG STA 2180		
T68	10/06/02	BOAT #5	TRAWLING	__	2196	RED	STRINGER (SKETCHED 10/06)		
T69	10/06/02	BOAT #5	TRAWLING	__	2197	RED	STRINGER (SKETCHED 10/06)		
T70	09/29/02	BOAT #8	TRAWLING	__	2198	RED	FRAME SEG		
T71	10/06/02	BOAT #1	TRAWLING	__	2199	RED	FUSELAGE SKIN S10R-15R STA 1560 (SKETCHED 10/06)		
T72	09/29/02	BOAT #8	TRAWLING	__	2200	RED	FRAME SEG		
T73	09/29/02	BOAT #8	TRAWLING	__	2201	RED	FRAME SEG		
T74	10/06/02	BOAT #8	TRAWLING	__	2202	RED	FRAME SEG		
T75	10/13/02	BOAT #8	TRAWLING	__	2203	RED	STRINGER SEG		
T76		BOAT #8	TRAWLING	__	2204	RED	FUSELAGE FRAME		
T77		BOAT #8	TRAWLING	__	2205	RED	FUSELAGE SKIN		
T78	10/18/02	BOAT #8	TRAWLING	__	2206	RED	FUSELAGE SKIN		
T79		BOAT #8	TRAWLING	__	2207	RED	FRAME		
T80		BOAT #8	TRAWLING	__	2208	RED	SUPPORT STA 2120		
T81	10/06/02	BOAT #8	TRAWLING	__	2209	RED	FUSELAGE SKIN WITH STRINGER(SKETCHED 10/06)		
T82	10/06/02	BOAT #8	TRAWLING	__	2210	RED	CELLING SUPPORT (65B56182)		
T83	10/18/02	BOAT #8	TRAWLING	__	2211	RED	FLOOR BEAM WITH SEAT TRACK		
T84	10/18/02	BOAT #8	TRAWLING	__	2212	RED	FUSELAGE STRINGER		
T85		BOAT #8	TRAWLING	__	2213	RED	FLAP RIB		

T86		BOAT #8	TRAWLING	__	2214	RED	FRAME STA 2220		
T87		BOAT #5	TRAWLING	__	2215	RED	SEAT TRACK		
T88	10/16/02	BOAT #8	TRAWLING	__	2216	RED	FUSELAGE SKIN		
T89	10/18/02	BOAT #8	TRAWLING	__	2217	RED	FLOOR BEAM STA 1960		
T90	10/06/02	BOAT #5	TRAWLING	__	2218	RED	VERTICAL FIN LH SKIN PANEL (AFT OF FRONT SPAR)		
T91	10/06/02	BOAT #8	TRAWLING	__	2219	RED	FRAME & STRINGER		
T92		BOAT #8	TRAWLING	__	2220	RED	CELLING SUPPORT		
T93		BOAT #2	TRAWLING	__	2221	RED	FRAME SEG		
T94	09/27/02	BOAT #1	TRAWLING	__	2223	RED	T/E FLAP		
T95	10/18/02	BOAT #4	TRAWLING	__	2224	RED	BULK CARGO FLOOR		
T96	10/06/02	BOAT #5	TRAWLING	__	2225	RED	BULK CARGO FLOOR		

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