

**22<sup>nd</sup> MEETING OF THE  
INFORMAL SOUTH PACIFIC AIR TRAFFIC SERVICES COORDINATING GROUP  
(ISPACG/22)**

(Papeete, Tahiti – 12-14 March 2008)

**Agenda Item 5: Identify Future Work Programmes**

**Consistently Managing Space Activity**

*Presented by Len Wicks, Civil Aviation Authority of NZ*

**Consistently Managing Space Activity**

There are several space agencies that affect Pacific airspace with rocket launch, space vehicle re-entry or ballistic missile activities. In the past this activity has not been co-ordinated in a formal manner and the advice from space agencies and ANSPs has been inconsistent. The purpose of this paper is to provide information on how New Zealand manages this activity and to make recommendations to other affected States in order to ensure a consistent approach that minimises airline safety and efficiency issues, consistent with the provision of Annex 11, paragraph 2.18.

**1.0 Background**

1.1 The Auckland Oceanic Flight Information Region (FIR) is probably the main space debris re-entry airspace for most of the world's space agencies as it is relatively unpopulated. However this has presented problems in the past managing the consequences for air traffic and Air Navigation Service Providers (ANSPs). The space agencies that have affected the Auckland Oceanic FIR in the past are as follows.

- CNES (France, Centre National d'Études Spatiales <http://www.cnes.fr>), and the European Space Agency (Europe, ESA, <http://www.esa.int>), normally involving booster rocket launch activity from Kourou, French Guyana and re-entry activity de-orbiting space vehicles.
- Sea Launch (USA, Ukraine, Norway, Russia, <http://www.sea-launch.com>), uses a converted oil platform to launch Zenit rockets to geostationary or low earth orbit when a position on the Auckland Oceanic FIR boundary near Christmas Island (Kiribati Islands).
- NASA (USA, National Aeronautical and Space Administration, <http://www.nasa.gov>), normally involving Space Shuttle Solid Rocket Booster and Tank re-entry activity from the Kennedy Space Centre, as well as de-orbiting of space vehicles resulting in debris over a wide area.
- US Air Force (USA, <http://www2.hickam.af.mil>), Pacific Air Forces Headquarters based at Hickham Air Force Base, normally involving ballistic missile re-entry activity.
- Russian Federal Space Agency (Russia, Федеральное космическое агентство России, <http://www.roscosmos.ru>), normally involving re-entry activity de-orbiting space vehicles.

1.2 Adjacent FIRs are also affected for space activity, such as Oakland (Sea Launch), Tahiti, Easter Island and Nadi. The Russian MIR space station re-entry affected several FIRs, including Brisbane, Nadi, Auckland and Tahiti.

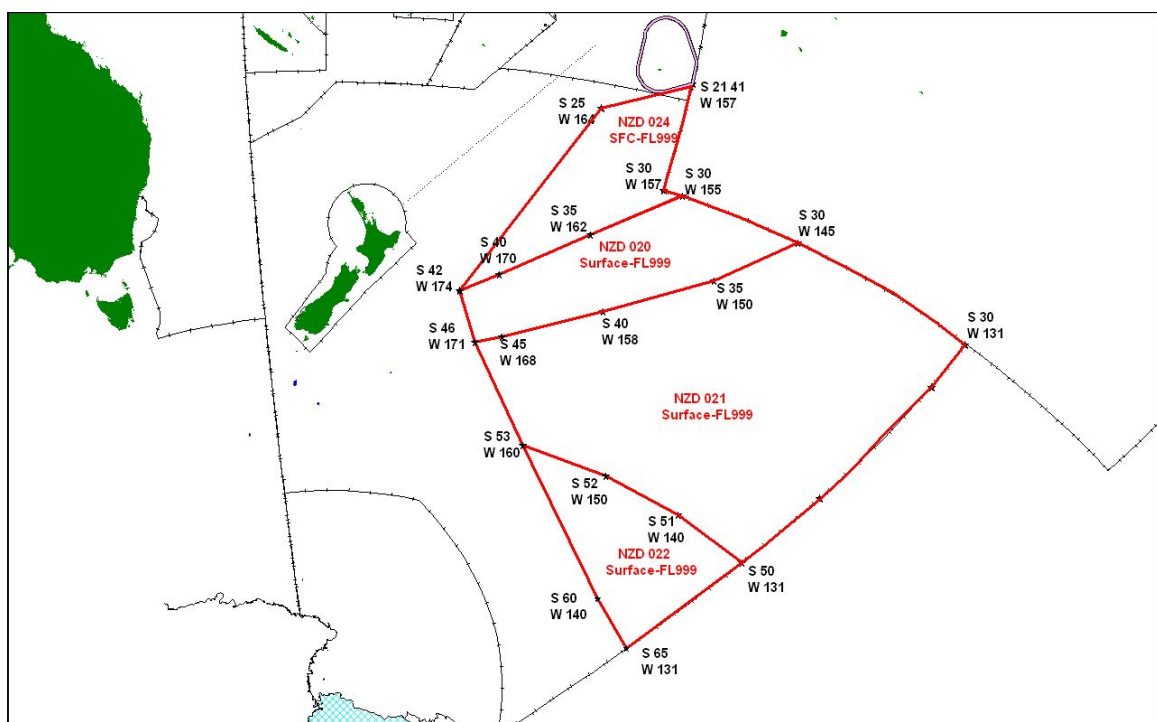
## 2.0 Discussion

### Notification

- 2.1 The notification process from the different space agencies varies considerably, from AFTN (Aeronautical Fixed Telecommunications Network) messages to facsimile, and e-mail, using a variety of forms and templates (see Appendix 1 examples). Many agencies provide voluminous co-ordinates and some have diagrams to describe the affected airspace. All of this requires interpretation and thus introduces workload and the possibility of human error.
- 2.2 The timeframe for warnings also varies, from a month to less than 24 hours in the worst extremes. In general the longer the warning time, the less accurate the warning time is, especially for vehicle launches. The minimum time for advice of airspace activation is stated as seven days (Annex 15, paragraph 5.1.1.4) but many States including Canada, the UK and New Zealand have filed Differences with this requirement, stating it is impossible or impractical to comply. New Zealand Civil Aviation Rule Parts 71.153(c)(2), 71.155(c)(2), and 71.161 (c)(3) all require a minimum notice period of 24 hours. This allows the most efficient utilisation of airspace, taking into account factors such as operational capability and weather at the time of the activity.

### Airspace

- 2.3 The most efficient means of describing airspace that is used on a regular basis is by designation of a danger area. Restricted areas are not able to be used in international waters under the provisions of Annex 2, which defines restricted areas as being above the land areas or territorial waters of a State. A danger area will be coded so it can be identified in Air Traffic Management (ATM) systems such as Aircraft Situation Displays (ASD) and Flight Management Systems. This allows the airspace to be quickly identified in such systems with less possibility of human error compared to interpretation of co-ordinates.
- 2.4 New Zealand has designated four danger areas to encompass space activity as shown in the following image. The danger areas have been designed to be used either singularly (for example NZD 020 - Space Shuttle tank re-entry) or concurrently, and avoids the most commonly used air routes.



### Co-ordination

- 2.5 The New Zealand Civil Aviation Authority (CAA) has been co-ordinating with various space agencies such as CNES to ensure that notifications of space activity use the designated danger areas to the maximum extent practicable, in order to avoid adversely affecting international air traffic. There is a need for other affected States to consider a similar approach to the management of this activity, with a goal of a regionally accepted set of standards and procedures. Pacific States will then be able to respond optimally to the situation instead of on an ad-hoc basis and activity affecting different FIRs will be uniformly managed across the region. Space agencies will be more inclined to conform to regionally accepted practices and will be less confused about what they have to do if the process is simple, transparent and universal.
- 2.6 As a model of what is considered optimal co-ordination, New Zealand has recently started requiring space agencies to send notification like the following example to the New Zealand International NOTAM Office (nof@airways.co.nz) and copied to the CAA (aero@caa.govt.nz) 24-48 hours before the activation.

#### NOTAM REQUEST

Please issue a NOTAM for activation of NZD 021 and NZD 022 due to the re-entry of the ATV vehicle as follows:

- A) NZZO
- B) 0805061200
- C) 0805061400
- D) -
- E) DANGER AREA NZD 020 AND NZD 021 ACT BTW 0805061200 AND 0805061400 DUE SPACE RE-ENTRY ACTIVITY
- F) SFC
- G) FL999

#### Explanation for Space Agencies

**Section A** 'NZZO' is the Auckland Oceanic FIR.

**Section B** is the 10 digit time in UTC YYMMDDTTTT for the start of the activation.

**Section C** is the 10 digit time for the finish.

**Section D** this would not normally be used as it is for periodic activations such as 1200-1400 each day for a week.

**Section E** is the main text indicating which danger area is active (note in the example two danger areas are activated together - one can be activated by itself or several at a time).

Section F is the lower limit (surface).

Section G is the upper limit (in this case all the space danger areas are designated as extending to flight level 999 or approximately 100,000ft, which is the upper limit of the Auckland Oceanic FIR).

### 3.0 Recommendations

- 3.1 ISPACG States should consider the advantages of airspace designation (danger areas activated by NOTAM) for space activity in order to:
  - a) encourage agencies to contain activity clear of major air routes and inhabited places;
  - b) reduce workload when managing short notice requests and human error when interpreting co-ordinates; and
  - c) enable ATM and FMS to quickly recognise affected airspace so that efficient alternative routes can be established.
- 3.2 ISPACG States should consider a regional accord whereby standard notification procedures are required and accepted from space agencies affecting Pacific airspace, both in terms of format, terminology and time period.



#### 4. Appendix 1

##### *Sea Launch Advisory Example*

Log #: SL-32-DK-004  
Date: March 03, 2008  
From: Sea Launch Range Control  
2700 Nimitz Road Mail Code: RJ-00  
Long Beach, CA 90802  
To: See Distribution List  
Subject: Notice to Mariners and Aviators of Planned Commercial Rocket Launch,  
Revision: A

This communication is to inform you of the planned rocket launch by the Sea Launch Company from a location East of Christmas Island, Republic of Kiribati.

**Location:** Launch Platform "Odyssey" 0°0'N, 154°0'W

**Date:** March 17 – 18, 2008

**Time:** 22:12:00 to 00:17:00 UTC

In the interest of safety, vessels and aircraft are advised to stay clear of areas bounded by the following for the entire duration listed above:

**0°15'N – 0°15'S; 153°15'W – 154°20'W**

**0°12'N – 0°12'S; 146°36'W – 148°06'W**

**0°18'N – 0°18'S; 143°54'W – 146°00'W**

**0°24'N – 0°24'S; 111°24'W – 116°30'W**

Please provide this information to vessel operators within your area of administration that may be in the general vicinity of these four positions.

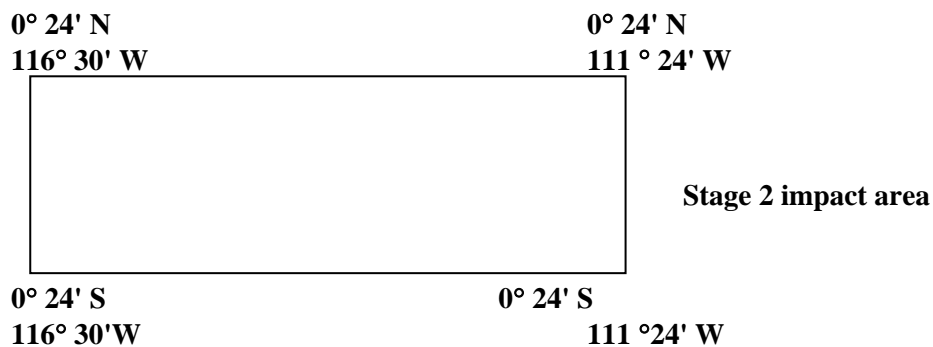
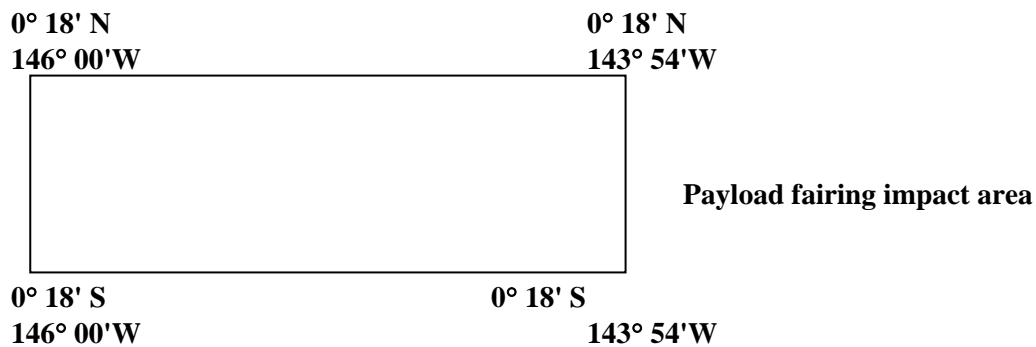
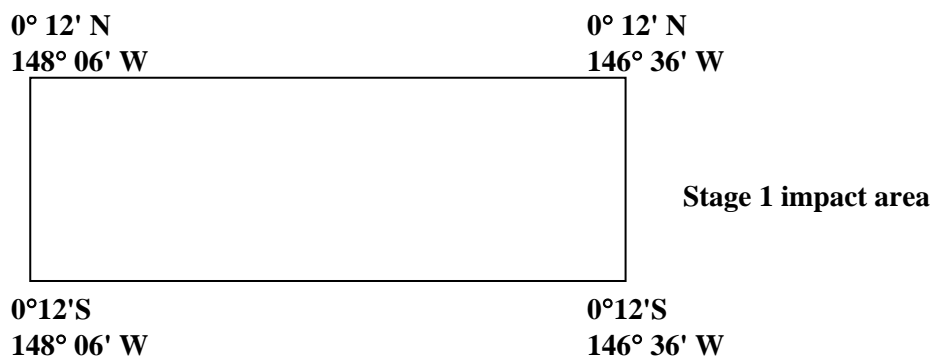
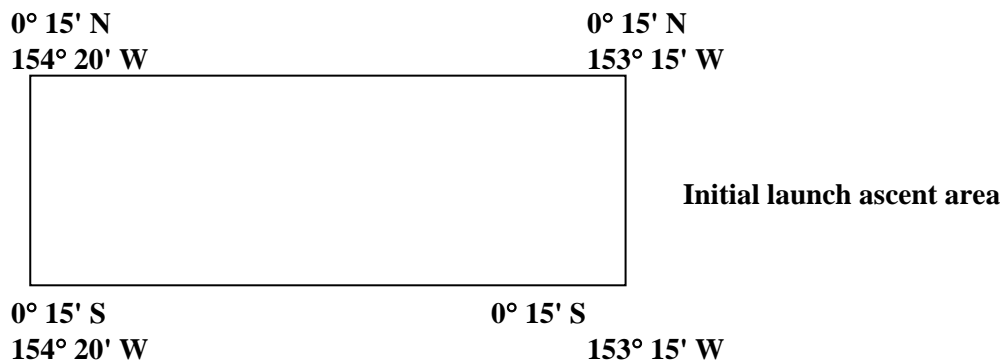
Per Sea Launch Company procedures and FAA launch license requirements, this message will be sent to you again with subsequent updates if required. Information will also be posted at the following web site: <http://www.sea-launch.com>.

Please contact the Sea Launch Company at 206-770-4400 x2991 if you have any questions.

Sincerely,

Darcey Kuhn  
Range Coordinator

**SL-32 (DirectTV 11) CARF Rectangles** (Peter Halamek, 6 February 2008, based on MDD plus 2km)





ISPACG/22  
WP-23  
06/03/08

**CNES Advisory Example**

220405 S000YNYX

NR 02/08/CC/CC ON FEBRUARY 22TH 2008

ATTN BNI TAHITI BNI GUAYAQUIL BNI NOUVELLE ZELANDE OBJECT: FRENCH GUYANA SPACE KOUROU STOP ROCKET LAUNCHING V181 - MISSION ATV JULES VERNE IS SCHEDULED FROM MARCH 08TH 2008 TO MARCH 18TH 2008 STOP FOR YOUR FIR WOULD YOU PLEASE ISSUE A NOTAM ADVISING PILOTS OF THE EXISTENCE OF DANGEROUS ZONES DUE TO ROCKET STAGES FALLING AREA STOP R4/V181 FIR TAHITI NOUVELLE ZELANDE OCEAN PACIFIQUE GUAYAGUIL QUADRILATERAL FROM MSL TO UNLIMITED PSN :

03DEG24S,105DEG52W

05DEG32S,102DEG54W

53DEG21S,175DEG36W

49DEG24S,176DEG29W

THESE ZONES WILL BE ACTIVATED EACH DAY FROM MARCH 08TH 2008 TO MARCH 18TH 2008 BETWEEN 0620TU TO 0905TU PLEASE ACKNOWLEDGE THIS MESSAGE AND SEND US FILED NOTAM NUMBER STOP THIS INFORMATION TRANSMITTED ON BEHALF FRENCH GUYANA SPACE CENTER PHONE NUMBER :(594) 0594335575

FAX NUMBER :(594) 0594334666

STOP END

SIGNED JEAN ANTOINE PHILIPPE CHIEF CONTROL CENTER CAYENNE ROCHAMBEAU