Organización de Aviación Civil Internacional
Grupo Regional de Planificación y Ejecución CAR/SAM (GREPECAS)
Decimoctava Reunión del Grupo Regional de Planificación y Ejecución CAR/SAM (GREPECAS/18)
Punta Cana, República Dominicana, 9 al 14 de abril de 2018

Cuestión 3 del Orden del Día: **Actividades de navegación aérea a nivel global, inter e intrarregionales**

3.2 Seguimiento en la implantación de las actividades a nivel global, inter e intrarregionales

PROYECTO LOON – TORRES FLOTANTES DE TELEFONIA CELULAR EN EL ESPACIO

(Presentada por CANSO)

RESUMEN

Esta nota presenta información actualizada sobre el Proyecto Loon, una red de globos libres no tripulados, pesados, que vuelan a gran altitud, y cuyo objetivo es llevar el servicio de Internet a partes del mundo que se encuentran desatendidas. Asimismo, describe el respaldo otorgado por la Asamblea General de la OACI a este proyecto, que apoya la iniciativa de la OACI de "Ningún País se Queda Atrás", y que también es compatible con las Metas de Desarrollo Sostenible de las Naciones Unidas. La nota presenta, también, los logros recientes y planes para el futuro. El Proyecto Loon agradece a los Estados de la OACI por su continuo apoyo.

1. Introducción

1.1 El Proyecto Loon busca brindar servicios de educación, inversión, información médica remota y de emergencia, mediante la ampliación de la capacidad de telecomunicaciones y de internet de los proveedores de servicios locales a zonas del mundo que actualmente no están debidamente atendidas. Mediante la utilización de una efectiva Gestión de la Seguridad Operacional, el Proyecto Loon ha logrado volar, en forma segura, más de 1,600 globos por más de 800,000 horas de vuelo recorriendo más de 30 millones de kilómetros probando sus sistemas.

1.2 El Proyecto Loon obtuvo el respaldo de la Asamblea General de la OACI y continúa ampliando su red de acuerdos con los Estados de la OACI, formalizando procedimientos operacionales seguros y eficientes. El Proyecto Loon ha formalizado procedimientos operacionales con Estados en todos los continentes, excepto la Antártida.

1.3 El Proyecto Loon anunció un logro significativo en cuanto a una navegación más eficiente y mejores algoritmos para el pilotaje automatizado. Para ello, en cooperación con la AAC y el ANSP de Ecuador, el Proyecto Loon hizo volar dos globos Loon a FL 600 hasta las Islas Galápagos, donde los miembros del Consejo de la OACI pudieron observarlos en el aire durante su reciente visita exploratoria a Ecuador. Asimismo, el Proyecto Loon hizo volar un globo Loon hasta Nairobi, Kenia,

donde los participantes de la Vigésima Primera Reunión del Grupo Regional de Planificación e Implementación del África-Océano Índico (APIRG/21) tuvieron la oportunidad de observarlo flotando a gran altura.

1.4 En los últimos meses, en cooperación con el Gobierno Peruano y proveedores de servicios locales, el Proyecto Loon ha proporcionado servicios de telecomunicaciones y de internet a decenas de miles de ciudadanos peruanos cuyas funcionalidades habían sido interrumpidas debido a daños en la infraestructura terrestre ocasionados por grandes inundaciones. Esta experiencia permitió a Loon ofrecer asistencia humanitaria similar a Puerto Rico, devastada por el Huracán Maria, brindando conectividad de emergencia a más de 200.000 usuarios en las islas afectadas. Loon agradece a los países del Caribe, Centroamérica y Sudamérica que permitieron la realización de un mayor número de sobrevuelos para permitir brindar esta asistencia humanitaria.

2 Discusión

Avances hasta la fecha

2.1 El Proyecto Loon se inició en 2013 y, durante su etapa inicial, se enfocó en el globo mismo y en la seguridad de los vuelos. Mediante el uso efectivo de la Gestión de la Seguridad Operacional, Loon mejoró el diseño, la fabricación y los procedimientos de lanzamiento de los globos. Actualmente, los globos son muy resistentes, a menudo permanecen en el aire mucho más de los 100 días previstos, y son lanzados utilizando un lanzador automático desarrollado a medida, permitiendo lanzamientos rápidos. Mediante la práctica de la Gestión de la Seguridad Operacional, Loon va más allá del simple cumplimiento con las normas de la OACI, agregando varios niveles adicionales de equipos de seguridad (incluyendo ADS-B) a bordo del globo en sí y en la carga útil de comunicaciones.

2.2 Algo singular de Loon es que el sistema de control de misión combina fuentes de información de viento de libre disposición con sus propios datos exhaustivos de vuelo, utilizando su gran potencia computarizada para crear modelos y simulaciones que permiten una navegación más eficiente de los globos. Esto, a la vez que mejora la seguridad operacional y la navegación, ha permitido que los globos permanezcan dentro del área geográfica general donde se requiere el servicio. Esta importante mejora en la navegación le permitirá a Loon enfocar sus recursos en aquéllos que más lo necesitan.

2.3 Actualmente, el Proyecto Loon realiza lanzamientos (de conformidad con las directivas de la FAA) desde Nevada y Puerto Rico, con un desplazamiento a través de una "trayectoria de flotación." Loon utiliza una plantilla normalizada para sus procedimientos operacionales para asegurar vuelos seguros. Los procedimientos operacionales brindan las notificaciones operacionales que cada Estado desea, en el momento y con la frecuencia que lo desee, antes de ingresar a una región de información de vuelo. Y se brinda actualizaciones continuas de acuerdo a los deseos del Estado.

Reafirmación

2.4 Es importante recordar que los globos del Proyecto Loon nunca están equipados con dispositivos militares DE NINGUN TIPO, no llevan cámaras y no tienen capacidad de vigilancia (aparte de ADS-B). El Proyecto Loon está totalmente comprometido con ser un buen ciudadano de la aviación.

2.5 El modelo de negocios del Proyecto Loon consiste en asociarse con empresas de telecomunicaciones locales para aumentar la infraestructura de las mismas, ofreciendo a los ciudadanos los servicios requeridos, de una manera innovadora.

3 Siguientes pasos

3.1 Loon tiene proyectado realizar otra serie de demostraciones regionales, enfocándose en las zonas desatendidas y, actualmente, está desarrollando estas asociaciones con autoridades y portadoras de telecomunicaciones locales.

3.2 Tal como se indica en la Carta a los Estados de la OACI (Adjunto A), Loon busca activamente desarrollar relaciones de trabajo con autoridades de aviación civil y proveedores de servicios de navegación aérea clave con el fin de suscribir Cartas de Acuerdo (LOA) para permitir sobrevuelos y posibles emplazamientos de aterrizaje.

3.3 Loon está agradecido a los muchos Estados que han estado apoyando al Proyecto Loon desde sus inicios.

4. Acciones sugeridas

4.1 Se invita a la Reunión a:

a) tomar nota de la intención del Proyecto Loon de apoyar las Metas de Desarrollo Sostenible de las Naciones Unidas y la iniciativa de “ningún país se queda atrás” de la OACI;

b) tomar nota de la Carta a los Estados enviada por la Secretaria General **(Adjunto A)**, alentando la adopción de procedimientos operacionales normalizados;

c) cooperar con el Proyecto Loon mediante la suscripción de acuerdos normalizados de sobrevuelo (llamados Cartas de Acuerdo) de manera que Loon pueda ampliar sus pruebas y validaciones a nivel mundial y regional; y

d) reconociendo los beneficios que la Internet puede brindar a las poblaciones desatendidas, promover un mayor entendimiento con los ministerios de Estado asociados (por ejemplo, los ministerios de Defensa, Comunicaciones, etc.)

- FIN -

Attachment
English only

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Tel.: +1 514-954-8219 ext. 5323

Ref.: AN13/22.1-16/42 17 June 2016

Subject: High Altitude Operations of Unmanned Free Balloons

Action required: to assess impacts, as necessary

Sir/Madam,

1. I have the honour to draw your attention to Google Inc.'s "Project Loon", which aims to employ unmanned free balloons at high altitude to provide trans-global internet access.

2. As this first-of-its-kind project is being implemented and increasingly impacting the global airspace, I respectfully draw your attention to Annex 2 — *Rules of the Air*, Appendix 5, *Unmanned Free Balloons*. The enhancement of ICAO provisions applicable to unmanned free balloons so as to provide scope commensurate for the future growth of this aspect of civil aviation is currently underway.

3. To further assist you with assessing mechanisms to support safety and flight operations within your airspace in light of the potential for this heretofore unanticipated increase in high altitude balloon traffic, please also find enclosed – for informational purposes only – a briefing sheet prepared and furnished by Google on the project, as well as samples of some individual Member States' standards and procedures with regard to unmanned free balloons. I am hopeful that this information will prove useful.

Accept, Sir/Madam, the assurances of my highest consideration.

Fang Liu
Secretary General

Enclosures:
A — Project 'Loon' briefing sheet
B — Examples of individual State standards and procedures for unmanned free balloons

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Project Loon Information Brief

Project Loon is developing a network of unmanned free balloons (UFBs) at high altitude to bring Internet access to more people around the world, in partnership with local telecommunication companies. This project has great potential to solve a big global challenge. See www.google.com/loon.

Project Loon balloons are capable of multi-day long-range flights at high altitudes, generally over FL600. Project Loon conducts a number of research flights launched and landed within the United States, as well as long range flights which often circumnavigate the globe.

Operationally, Project Loon has dedicated Mission Control (for flight operations) and Recovery teams (that recover landed balloons). Our equipment and operations meet or exceed all requirements of ICAO Annex 2 Appendix 5 for Heavy UFBs. Standard procedures are outlined in Project Loon's Letter of Agreement (see 3.2).

To date, Loon has operated over 1,000 flights, ranging from short research and development flights to longer flights up to 180+ days aloft. In total, Loon balloons have traveled more than 16M km in distance, working in coordination with and authorization from over 75 civil aviation and Air Traffic Control (ATC) organizations across 6 continents.

1. Balloon Overview

Project Loon uses superpressure balloons equipped with limited altitude control systems. Air is pumped into an inner ballonet, allowing the balloon to modify its weight for ascent or descent. These altitude changes allow the balloon to take advantage of different wind patterns at different altitude for navigation. They are not able to directly control course or speed. Modeling how a balloon will fly at different altitudes is a significant technical achievement for the project, and Loon is constantly improving our predictive abilities.

1.1 Balloon Envelope Specifications

Both balloon and altitude control system are custom design, built, and developed by Project Loon.
Material: polyethylene or nylon
Weight: ~55 kg (envelope only); *weight varies based on configuration*
Dimensions: at launch, ~60ft high x 15ft wide (18m x 5m); at float, ~30ft high x 50ft wide (9m x 15m)
Note: Equipped with (1) at least 2 independent redundant flight termination systems (envelope cutters) and (2) an 8 ft long parachute (2.5m), deployed on descent

2. Flight System Overview

Loon balloons carry communications and safety equipment attached to the balloon envelope. The flight system contains a flight computer, lithium batteries, solar panels, environmental sensors, a transponder (Mode A/C; ADS-B Out capability on certain flights), radar-reflective material, a GPS receiver, an Iridium satellite communications link, and a parachute. Some balloons also carry communication equipment to conduct operations with local telecommunications companies, coordinated with the relevant government ministries or agencies.

Project Loon Information Brief

2.1 Flight System Specifications

Custom, under development by Google. Configuration may vary.

Dimensions: ~20” (0.5m) x 12” (0.3m), excluding solar panels
Weight: 30-50kg (including solar panels);
weight varies by configuration.
Material: foam and aluminum
Safety Components:
- radar-reflective material
- omnidirectional flashing white LED with 60 cycles per minute and 5 NM radius
- transponders are always on, and squawk ‘4453’ unless instructed otherwise, report verified barometric altitude (set to 29.92);
- parachute and safety tether ensure balloon and flight system stay as one during descent.

3. Flight Profile and Operations

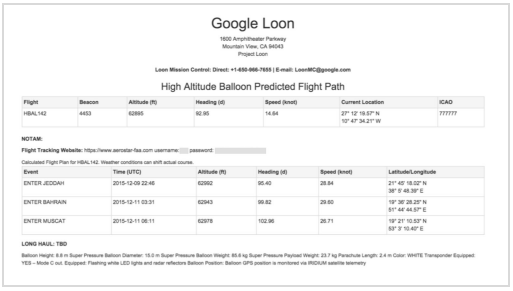
Balloons generally float at altitudes higher than FL600. With ATC permission, balloons may float at lower altitudes for additional maneuverability.

Loon Mission Control (LMC) consists of highly trained flight engineers on duty 24/7. Command and control is made possible with high frequency telemetry and system data communicated by satellite. Through multiple sensors tracking thousands of data-points, LMC can monitor health indicators of each balloon, make informed decisions, and communicate with ATC where appropriate. The project has proper mitigations and redundancies in place for potential failure modes.

3.1 Procedures and Operational Details

Flight Information

Flight Plans are shared* on a per balloon basis with ATCs. Information includes: LMC Contact Information, Flight Identifier, Current Position, Projected Entry Time and Position, Balloon and Flight System Description.



Google Loon

1600 Amphitheater Parkway
Mountain View, CA 94043
Project Loon

Loon Mission Control: Direct: +1-650-966-7655 | E-mail: LoonMC@google.com

High Altitude Balloon Predicted Flight Path

Flight	Beacon	Altitude (ft)	Heading (d)	Speed (knot)	Current Location	ICAO
HBAL142	4453	62895	92.95	14.64	27° 12' 19.57" N 10° 47' 34.21" W	777777

NOTAM:

Flight Tracking Website: https://www.aerostar-faa.com username: password:

Calculated Flight Plan for HBAL142. Weather conditions can shift actual course.

Event	Time (UTC)	Altitude (ft)	Heading (d)	Speed (knot)	Latitude/Longitude
ENTER JEDDAH	2015-12-09 22:46	62992	95.40	28.84	21° 45' 18.02" N 39° 5' 48.39" E
ENTER BAHRAIN	2015-12-11 03:31	62943	99.82	29.60	19° 36' 28.23" N 51° 44' 44.57" E
ENTER MUSCAT	2015-12-11 08:11	62978	102.96	26.71	19° 21' 10.53" N 59° 3' 10.40" E

LONG HAUL: TBD

Balloon Height: 8.8 m Super Pressure Balloon Diameter: 15.0 m Super Pressure Balloon Weight: 85.6 kg Super Pressure Payload Weight: 23.7 kg Parachute Length: 2.4 m Color: WHITE Transponder Equipped: YES – Mode C out. Equipped: Flashing white LED lights and radar reflectors Balloon Position: Balloon GPS position is monitored via IRIDIUM satellite telemetry

** report details and frequency can be tailored per ATC; Flight Plan example to the right*

Ascent

Balloons are currently launched from the United States and a small number of additional sites, in coordination with the FAA.

Ascent overview:

- Weeks prior: Weather and conditions monitored and flight path simulated.
- 24hr prior: File flight plans and NOTAMS with ATC authorities, share updated simulations.
- 1hr prior: Final inspections, checklists, coordination with ATC, and balloon is filled.
- 5min prior: File launch notification with local ATC.

Project Loon Information Brief

Transit

Loon Mission Control coordinates with ATC to maneuver our balloons. Separation is sometimes applied.

Transit overview:

- 72hr prior: Flight Plans sent to ATC in agreed upon format (e.g. phone / email / fax).
- 12hr following notification: Flight Plan Updates continue to be sent every 12 hours until balloon completes transit.
- 1hr prior: Telephone call to affected ATC if desired

Notes on separation:

- There is often no lateral separation standard for flights above FL600.
- Below FL600, separation varies by country and airspace across a wide spectrum.

Descent

Safety is our primary concern when descending balloons. Loon often plans descents 30 days in advance, and always coordinates with ATC.

Descent overview:

- Weeks prior: Monitor balloon health and begin descent planning.
- 24hr prior: Forecast direction of travel, speed, time & location of landing, issue NOTAMs.
- 60min prior: Update metrics and information from previous forecasts.
- At descent: Confirm cutdown event and completion of descent.

Other descent details:

- Typical descent times range from approximately 40 minutes to 2 hours.
- Loon Mission Control projects flight path during descent, which is shared with ATC upon request.
- Parachute recovers both flight system and balloon material.

Unplanned Descents

- Burst or Major Leak: Only occurs early in life and close to launch location. Typically conducted in controlled manner for testing purposes. Operational risk management in place.
- Slow loss of pressure: More frequent during research phase. Operational risk management in place -- close coordination with ATC to descend balloons in controlled manner.
- Loss of Power: Very rare. Operational and technical risk management in place.
- Communications Failure: Very rare. Operational and technical risk management in place.
- Flight Engineer Error: Has not occurred. However training and redundancies in place.

3.2 Website and Letter of Agreement

Loon's near-real time position tracking website reports the same information as shared in the Flight Plans. It provides answers to Frequently Asked Questions as well as a template Letter of Agreement outlining Project Loon's Standard Operating Procedures**. Log-in information is provided upon request, or by filling out the form found at https://goo.gl/wt1ddM

***Available in Arabic, Chinese (simplified), English, French, Portuguese, Russian and Spanish*

ATTACHMENT B to State letter AN 13/22.1-16/42

EXAMPLES OF INDIVIDUAL STATE STANDARDS AND PROCEDURES FOR UNMANNED FREE BALLOONS

(Approved by the respective State regulatory authority)

1. **AUSTRALIA**

Temporary Local Instruction

TLI_15_0318

Project Loon Balloons – Separation and Coordination

Effective from:	**UTC 1512012035**	**Effective to:**	1605251600
Authorised:	Robyn Leece, ATS Integrity Manager Neil Bain, LCMM	**Replaces:**	Nil
NRFC:	30378	ASID:	CIRRIS:

Audience:	Adelaide TCU	Airspace and Military Liaison	Alpine	ATC Procedures
	ATS School	Barossa	Bass	BN FDC
	BN ORM	BN SM 1	BN SM 2	BN SM 3
	BN SS	Brisbane TCU	Byron	Cairns TCU
	Capricornia	Central	Continuous Service Improvement	East
	Operational Supervisors En route and TCU	Fraser	Grampians	Gwydir
	Hastings	HF	Melbourne and Canberra TCU	ML FDC
	ML ORM	ML SM 1	ML SM 2	ML SM 3
	ML SS	Monaro	Outback	Perth TCU
	Reef	SM HF	Southwest	Sydney TCU
	Tops	West		

Reference documents	CASA Instrument 65/14 Manual of Air Traffic Services (MATS) (NOS-SAF-2000) Chapter 10.2 Manual of Air Traffic Services (MATS) (NOS-SAF-2000) Section 10.10.1 DIR_15_0024 (cancelled) LoA_3365 TLI_15_0077 (cancelled) TLI_15_0202 (cancelled)

Background

This TLI renews TLI_15_0202 issued 29 July 2015.

The altitude sourced for Project Loon balloons from the Project Loon website is still a geometric height. It's the project's intention to fit compliant ADS-B with barometric height in the near future.

Until Project Loon balloons are fit with compliant ADS-B with barometric height, the following advice and instructions still apply:

1. MATS 10.10.1.2 only applies to Project Loon balloons during the initial ascent phase.

2. Lateral separation between Project Loon balloons and other manned aircraft may be achieved by the application of MATS 10.10.1.3 using position information sourced from the Project Loon website.

3. You may apply ATS surveillance system separation between Project Loon balloons and manned aircraft as per MATS Chapter 10.2.

4. Position information sourced from the Project Loon website may satisfy coordination requirements if appropriate procedures are developed at the group level to ensure the correct and timely dissemination to controllers. Where coordination is effected using a standard agreement between ATC units or by system means, these should be detailed in local instructions or letters of agreement.

Instruction

Vertical segregation between Project Loon Balloons and manned aircraft

Apply a 10,000 FT buffer above and below a Project Loon Balloon when segregating with manned aircraft in controlled airspace. Apply the buffer to both the Mode C level within radar coverage and a level sourced from the Project Loon website outside radar coverage.

Note: Project Loon Website: https://www.aerostar-faa.com
(u: faa p:99CrimsonBall@@ns)

Exceptions to vertical segregation between Project Loon Balloons and manned aircraft

Unless visual separation is applied, do not permit manned aircraft to transit vertically below a 15 NM radius of Project Loon Balloon while the balloon is on:

a) initial ascent (see MATS 10.10.1.2); or

b) final descent to the ground.

10.10 Miscellaneous

10.10.1 Unmanned free balloons

10.10.1.1 Visual separation

Visual separation between an aircraft and a Medium or Heavy unmanned free balloon may be applied provided that the:

a) confirmed drift of the balloon is away from the aircraft;
b) balloon is ascending; and
c) operations are during daylight.

10.10.1.2 Avoid transit below

Due to the possibility of cutdown without warning, unless visual separation is applied, do not permit aircraft in CTR/CTA to transit vertically below a 15 NM radius of a Medium or Heavy unmanned free balloon's position while the balloon is ascending until the balloon has passed FL600.

10.10.1.3 Lateral navigation tolerances

Apply a navigation tolerance of +/- 15 NM to a Medium or Heavy unmanned free balloon. Apply a 1 NM buffer between the navigation tolerances of an aircraft and a Medium or Heavy unmanned free balloon.

10.10.1.4 Plotting track

When plotting the predicted track of a Medium or Heavy unmanned free balloon, apply a tolerance of +/- 15 NM radius drawn at the:

a) departure point;
b) FL200 predicted position; and
c) FL600 predicted position.

10.10.1.4.1 Redraw at FL200

Redraw the predicted track using FL200 actual position, and incorporate and update track information.

10.10.1.5 LoA

A LoA is to be signed between the relevant ATS Unit and the operator of a Medium or Heavy unmanned free balloon prior to commencement of operations, detailing:

a) notification procedures;
b) communication requirements;
c) launch and cutdown procedures; and
d) restrictions on particular time blocks for launches due to increased RPT traffic on adjacent upper air routes.

10.2 ATS surveillance system

10.2.1 ATS surveillance system separation - conditions

10.2.1.1 Application

Only apply ATS surveillance system separation between identified aircraft when there is reasonable assurance that identification will be maintained.

10.2.1.2 Establish direct communications

Establish direct VHF/UHF communications between ATC and the aircraft prior to the provision of ATS surveillance separation.

See MATS 6.4.5.1 Control and communication responsibility

10.2.1.2.1 Exception, direct communications do not exist

You may provide surveillance separation to aircraft without direct VHF/UHF communications where special circumstances exist, such as emergencies, or when under normal operation there would be no possibility of intervention required, including where:

a) the disposition and relative performances of all aircraft concerned are such that ATS surveillance system separation exists and will continue to exist;

b) a procedural separation standard is established;

c) snap shot information is provided to another ATS unit, such as:

   i) position information, of the aircraft, or of the aircraft relative to airspace routes, boundaries or locations depicted on the situation display; or

   ii) the relative disposition of two or more aircraft e.g. definite passing; or

d) aircraft are approved to leave the frequency.

See MATS 5.1.6 Military Non-Continuous Communication (NOCOM) flights
6.4.5 Communication responsibility
10.2.1.5 Leaving controlled airspace

10.2.1.2.2 Communication adequacy

Where direct communications do not exist, assess the adequacy of the available communication link prior to and during the application of surveillance-based separation minima. Consider the possibility of unexpected intervention, the time required to receive replies from two or more aircraft and the overall workload/ traffic volume.

10.2.1.3 Measuring between position symbols

Apply separation based on the distance between the centres of position symbols.

10.2.1.3.1 No overlap

Do not allow edges of the position symbols to touch or overlap unless vertical separation is applied between aircraft.

10.2.1.4 ADS-B position symbols

When using ADS-B position symbols, only use Class 1 symbols for ATS surveillance system separation.

10.2.1.4.1 RAIM outage area

Do not apply ATS surveillance system separation using ADS-B position symbols within a forecast immediate RAIM outage area.

10.2.1.5 Leaving controlled airspace

You may apply ATS surveillance system separation between aircraft about to leave controlled airspace provided that:

a) the horizontal separation is not less than the prescribed minimum; and

b) you pass mutual traffic information to the aircraft concerned before they leave controlled airspace.

10.2.1.6 Procedural navigation tolerance

Where an aircraft is under ATS surveillance system control and will remain identified you may provide ATS surveillance system separation from the procedural navigation tolerance of an aircraft not under ATS surveillance system control provided:

a) the procedural navigation tolerance is shown on the situation display; or

b) a surveillance separation minimum and the procedural tolerance applicable to the non-surveillance aircraft are applied when constructing a lateral separation diagram or using an authorised lateral separation tool.

10.2.1.7 Separation - inside/outside coverage

Separation continues to exist between aircraft when one of the aircraft has passed beyond ATS surveillance system coverage provided that when proceeding:

a) on the same track, ATS surveillance system separation existed at the time the leading aircraft passed beyond ATS surveillance system coverage, and procedural separation is established before the following aircraft arrives within 5 NM of the last observed position of the leading aircraft; or

b) on reciprocal tracks, the aircraft in ATS surveillance system coverage has passed the last observed position of the outbound aircraft by the applicable ATS surveillance system separation minimum.

10.2.2 ATS surveillance system standards

10.2.2.1 Half the applicable standard

You may apply half the applicable ATS surveillance system separation minimum from a displayed system map boundary when:

a) the adjacent ATS unit, in controlled airspace, has the same ATS surveillance system processing and display system;

b) the Restricted Area activity is designated 'non-flying'; or

c) the Restricted Area activity is designated 'military flying' and the ADF will apply the following separation between the activity and the Restricted Area boundary:

   i) Half the applicable ATS surveillance system separation minimum as detailed in MATS Supplementary Procedures; or

   ii) An appropriate procedural navigation tolerance.

See MATS 2.4.3.4.4 Military flying/non-flying classification - Refer IMA V35_02 for Restricted Area activity designation.

10.2.2.1.1 Different minima on either side of an airspace boundary

Where different ATS surveillance system separation minima apply on either side of an airspace boundary, apply half the larger of the two minima to the system map boundary.

10.2.2.1.2 Operations up to an airspace boundary

Apply ATS surveillance system separation minimum to a system map boundary that divides ATS units where one unit is authorised to operate up to the boundary.

10.2.2.2 S1 - 3 NM

Conditions	Exceptions
Aircraft are in communication with and under the control of either a TCU or an associated control tower providing Class C or Class D services and are: a) within 100 NM of an MSSR sensor; b) within 30 NM of a radar sensor using: i) military high definition Terminal Approach Radar (TAR); or ii) primary data from a civil high definition TAR; or c) within ADS-B surveillance.	a) Parallel approaches in IMC; b) Where the required wake turbulence distance separation minimum is greater than 3 NM; and c) Prevented from use by local instructions.

10.2.2.3 S2 - 5 NM

Conditions	Exceptions
No additional conditions	a) Parallel approaches in IMC; and b) Where the required wake turbulence distance separation minimum is greater than 5 NM.

10.2.2.4 S3a - 5 NM, UFB or DRA (TMA/TCU)

Conditions	Exceptions
a) UFB or DRA; b) TMA/TCU; and c) Display range does not exceed 150 NM.	Not applicable

10.2.2.5 S3b - 10 NM, UFB

Conditions	Exceptions
a) UFB; and b) Display range does not exceed 500 NM.	Not applicable

NAV CANADA

FMP 2015-142

Jeff Dawson
Director, Standards and Procedures
Directeur, Normes et procédures
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Email / Courriel : jeff.dawson@navcanada.ca

MEMORANDUM / NOTE DE SERVICE

DATE : September 10, 2015/Le 10 septembre 2015

TO/À : Distribution list/Liste de diffusion

SUBJECT: Large unoccupied free balloons

Introduction

The aim of this memorandum is to provide guidance to ATS units regarding large unoccupied free balloons operating in accordance with TC-approved Special Flight Operations Certificate (SFOC).

The increasing number of large unoccupied free balloons in Canadian airspace could pose risks to flight safety. Per ICAO Doc 4444 and CARs, IFR services are not provided to balloons. In view of this increased balloon activity, however, services provided to conventional IFR/CVFR traffic have been reviewed. Until relevant international and domestic regulations are developed by ICAO and Transport Canada, this interim guidance is provided for controller application. Following analysis, ICAO and Transport Canada are expected to establish appropriate separation criteria.

Balloon Flight Stages

Pre-Launch

Assign a discrete transponder code no later than pre-launch approval.

NOTE: Approve the launch only when the balloon safety officer (BSO) confirms that the balloon is equipped with a serviceable Mode A/C transponder that is aviation certified.

OBJET : Gros ballons libres non habités

Introduction

La présente note de service a pour but de fournir aux unités ATS une directive sur les gros ballons libres non habités évoluant avec un certificat d'opérations aériennes spécialisées (COAS) approuvé par Transports Canada (TC).

Le nombre croissant de gros ballons libres non habités dans l'espace aérien canadien peut constituer des risques pour la sécurité des vols. Conformément au document 4444 de l'OACI et au *Règlement de l'aviation canadien* (RAC), les services IFR ne sont pas fournis aux ballons. Toutefois, compte tenu de l'augmentation des vols de ballons, les services fournis au trafic IFR/CVFR conventionnel ont été revus. En conséquence, jusqu'à ce que la réglementation canadienne et internationale pertinente soit élaborée par l'OACI et Transports Canada, la présente directive intérimaire est fournie pour son application par les contrôleurs. Il est prévu que l'OACI et Transports Canada analyseront cette situation et élaboreront les critères d'espacement appropriés.

Étapes de vol d'un ballon

Pré-lancement

Assignez un code discret de transpondeur au plus tard lors de l'approbation de pré-lancement.

NOTA : Approuvez le lancement seulement si le responsable de la sécurité du ballon (BSO) confirme que le ballon est équipé d'un transpondeur mode A/C homologué et en bon état de fonctionnement.

Once launched, balloons with mode C transponders cannot change codes.

Une fois lancés, les ballons avec un transpondeur mode C ne peuvent changer de codes.

Delay or deny balloon launches based on one of the following:

- Immediate flight safety concerns
- Traffic density in the immediate vicinity or controller workload that would make dissemination of balloon information to pilots unfeasible
- Traffic density and planning requirements of any affected units or sectors[1]

Retardez ou refusez le lancement d'un ballon en fonction de l'une ou l'autre des considérations suivantes :

- Problème immédiat pour la sécurité aérienne
- Densité du trafic aérien dans les environs immédiats ou impossibilité pour le contrôleur de transmettre des renseignements sur le ballon aux pilotes en raison d'une charge de travail trop lourde
- Densité du trafic aérien et exigences en matière de planification de toutes les unités ou de tous les secteurs touchés[1]

As soon as feasible, provide the BSO with an acceptable launch window.

Dès que possible, fournissez au BSO une fenêtre de lancement acceptable.

The entry or existence of a balloon flight plan does not constitute an ATC clearance or approval for launch. Information is for planning purposes only.

Le dépôt ou l'existence d'un plan de vol de ballon ne constitue pas une autorisation ou une approbation du lancement par l'ATC. Ces renseignements servent à des fins de planification seulement.

When the balloon operation originates in your AOR, advise all affected units/sectors of pre-launch preparations, the expected and actual launch time, or expected airspace penetration time, as appropriate.

Lorsque le vol d'un ballon débute dans votre secteur de responsabilité, avisez toutes les unités/tous les secteurs touchés des préparatifs de pré-lancement, de l'heure prévue et réelle du lancement, ou de l'heure prévue de l'entrée dans l'espace aérien, selon ce qui s'applique.

Verbal coordination is necessary, for automated systems may not accurately transmit the information due to balloon profiles being generally vertical with low ground speeds.

Il est nécessaire d'assurer une coordination verbale étant donné que les systèmes automatisés pourraient ne pas transmettre les renseignements avec exactitude du fait que les ballons ont habituellement un profil de vol vertical avec une vitesse sol réduite.

Launch

If one of the following conditions is met, consider an unmanned free balloon identified:

Lancement

Considérez qu'un ballon libre non habité est identifié si l'une ou l'autre des conditions suivantes s'applique :

[1] CARs, 602.19, Right of way/Priorité de passage, 602.19, RAC

- The balloon is observed on surveillance display within one mile of the launch runway that is consistent with the time of launch and the proposed trajectory.

  NOTE: The above criteria apply only to runway launches.

- The balloon is observed on surveillance display over a fix indicated on the surveillance display and consistent with a position report received from the BSO, provided that the track is consistent with the proposed trajectory.

- The PPS disappears or changes to a PSR symbol after the BSO is instructed to change the transponder to “standby”. The PPS reappears or changes back to an SSR symbol after the BSO is instructed to return the transponder to normal operation.

For the purpose of identification over a reported fix, a GPS-based lat/long readout received either directly from the BSO or from a real-time internet-based tracking system is considered sufficient. The location must be displayed and cross-referenced against the balloon target.

Provided that a passing altitude report comes directly from the BSO and the displayed altitude does not differ by more than 200 feet, consider an identified balloon’s altitude valid.

Do not use internet-based altitude reports to verify surveillance altitude readouts.

You may use internet-based readouts to provide flight information or situational awareness. GPS-based altitude reports can vary by approximately 120 feet compared with balloon Mode C reports.

Because altimeter settings cannot be adjusted during flight, balloon mode C readings are always based on standard pressure. When at 18 000 feet and below, consider the local altimeter to determine actual altitude.

- Le ballon est observé sur un écran de surveillance à moins d’un mille de la piste de lancement, ce qui est conforme à l’heure du lancement et à la trajectoire proposée.

  NOTA : Le critère ci-dessus s’applique uniquement aux lancements sur piste.

- Le ballon est observé sur un écran de surveillance au-dessus d’un repère indiqué sur l’écran de surveillance conforme au compte rendu de position reçu du BSO, pourvu que la route suivie soit conforme à la trajectoire proposée.

- La cible PPS disparaît ou se transforme en symbole PSR une fois que le BSO a reçu l’instruction de mettre le transpondeur en attente (« standby »). La cible PPS réapparaît ou redevient un symbole SSR une fois que le BSO a reçu l’instruction de rétablir le fonctionnement normal du transpondeur.

Aux fins de l’identification au-dessus d’un repère signalé, un affichage de la latitude/longitude basé sur le GPS reçu directement du BSO ou d’une application Internet de pistage en temps réel est jugé suffisant. L’emplacement doit être affiché et une correspondance doit être établie avec la cible du ballon.

Pourvu que le rapport de franchissement d’altitude soit fourni directement par le BSO et que l’altitude affichée diffère d’au plus 200 pieds, considérez que l’altitude d’un ballon identifié est valide.

N’utilisez pas les rapports d’altitude fournis par des applications Internet pour vérifier les affichages d’altitude sur les écrans de surveillance.

Vous pouvez utiliser les affichages d’altitude d’applications Internet pour fournir de l’information de vol ou aider à la conscience situationnelle. Les rapports d’altitude basés sur le GPS peuvent varier d’environ 120 pieds comparativement aux cibles mode C des ballons.

Étant donné que le calage altimétrique ne peut pas être ajusté durant le vol, les affichages des cibles mode C des ballons sont toujours basés sur la pression standard. Lorsqu’un ballon se trouve à une altitude de 18 000 pieds ou moins, utilisez le calage altimétrique local pour déterminer son altitude réelle.

Maintain surveillance on known balloons to the extent that equipment capabilities allow.

NOTE: Surveillance can be maintained at a supervisor or designated position.

Provided that the balloon is high enough to allow time for coordination in the event of an unplanned termination/descent, pilot advisories, and/or aircraft movement for separation requirements, tower controllers and those responsible for low-level airspace may stop maintaining flight data after the balloon has left their AOR vertically.

Some long-endurance balloons automatically turn off their transponder above FL600 to conserve battery power.

Maintain flight data to reflect the last known position at intervals appropriate to the phase of flight. As long-endurance balloons may float over a small geographic area for extended periods, flight data update intervals may be hourly or longer.

Flight Termination

Before approving a balloon flight termination request, consider

- The expected or actual location, time, and altitude where termination and balloon descent will commence
- Predicted or actual traffic density in the descent vicinity or controller workload that would make providing separation impractical or impossible
- Immediate safety concerns that cannot be addressed except by delaying flight termination
- Traffic density and planning requirements of any affected adjacent units or sectors as appropriate

Maintenez la surveillance des ballons connus dans la mesure où les capacités de l'équipement le permettent.

NOTA : La surveillance peut être maintenue au poste du surveillant ou du désigné.

Pourvu que le ballon soit à une altitude suffisamment élevée pour permettre la coordination en cas d'interruption du vol ou d'une descente imprévue, d'avis aux pilotes et (ou) de mouvements d'aéronefs requis pour satisfaire aux exigences d'espacement, les contrôleurs tour et les contrôleurs responsables de l'espace aérien inférieur peuvent cesser de tenir à jour les données de vol une fois que le ballon a quitté le plan vertical de leur secteur de responsabilité.

Certains ballons à grande autonomie ferment automatiquement leur transpondeur au-dessus du FL600 afin d'économiser les batteries.

Maintenez les données de vol de sorte qu'elles indiquent la dernière position connue à des intervalles appropriés à la phase de vol. Comme les ballons à grande autonomie peuvent flotter au-dessus de petits secteurs géographiques pendant de longues périodes, les données de vol peuvent être mises à jour toutes les heures ou à des intervalles plus longs.

Interruption du vol

Avant d'approuver l'interruption du vol d'un ballon, évaluez ce qui suit :

- L'emplacement, l'heure et l'altitude prévus ou réels où l'interruption du vol et la descente du ballon commenceront
- La densité prévue ou réelle du trafic aérien dans les environs de la trajectoire de la descente ou la charge de travail du contrôleur qui rendrait difficile ou impossible d'appliquer l'espacement requis
- Des problèmes de sécurité immédiats qui ne peuvent être résolus uniquement en retardant l'interruption du vol
- La densité du trafic aérien et des exigences de planification de toutes les unités ou de tous les secteurs adjacents, au besoin

Obtain sufficient information from the BSO or other tracking sources to accurately depict the area and time of balloon descent.

While flight termination can be delayed, it cannot be denied. The BSO requires enough remaining balloon battery power to successfully complete flight termination.

Surveillance

Apply separation consistently from identified balloons according to the following fundamentals of safe, orderly, and expeditious control:

- Planning
- Executing
- Monitoring

If one form of separation cannot be maintained, ensure that another exists before the previous one becomes insufficient.

These balloons may require mission-related repositioning. This necessitates an ATC-approved, controlled descent to altitudes at which favourable wind will displace the balloon laterally. Once repositioned, an ATC-approved, controlled climb will be initiated to return the balloon to the required operating altitude.

If exceptional circumstances call for extra caution, apply greater separation than the specified minimum.

Apply the following separation to IFR and CVFR aircraft from identified balloons:

Vertical Separation

Apply vertical separation from ascending, floating, or descending balloons as shown in the illustration. Provided that you receive a passing altitude report directly from the BSO and the displayed altitude does not differ by more than 200 feet, an identified balloon's altitude is valid.

Obtenez du BSO ou d'autres sources de pistage suffisamment de renseignements pour représenter avec exactitude la zone et l'heure de descente du ballon.

L'interruption d'un vol de ballon peut être retardée mais ne peut pas être refusée. La batterie du ballon doit pouvoir fonctionner assez longtemps pour que le BSO puisse interrompre le vol en toute sécurité.

Présence d'une couverture de surveillance

Appliquez les normes d'espacement de façon uniforme par rapport aux ballons identifiés conformément aux principes fondamentaux du contrôle sécuritaire, ordonné et rapide :

- Planification
- Exécution
- Surveillance

Si une forme quelconque d'espacement ne peut être maintenue, assurez-vous qu'il en existe une autre avant que la première ne suffise plus.

Ces ballons peuvent exiger un repositionnement stratégique. Ceci exige une descente contrôlée et approuvée par l'ATC à des altitudes où des vents favorables déplaceront le ballon latéralement. Une fois repositionné, le ballon amorcera une montée contrôlée et approuvée par l'ATC afin de retourner à l'altitude d'exploitation requise.

Si des circonstances exceptionnelles exigent ce surcroît de précautions, appliquez un espacement supérieur au minimum spécifié.

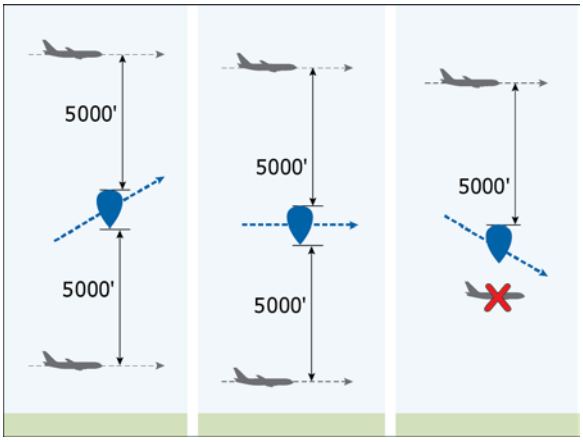
Appliquez l'espacement suivant entre les aéronefs IFR et CVFR et les ballons identifiés :

Espacement vertical

Appliquez un espacement vertical par rapport aux ballons en montée, flottant ou en descente tel qu'illustré. Pourvu que vous receviez un rapport de franchissement d'altitude directement du BSO et que l'altitude affichée diffère d'au plus 200 pieds, l'altitude d'un ballon identifié est valide..

During the flight termination phase, separate IFR and CVFR from each identified component separately.

Durant la phase d'interruption du vol, espacez les aéronefs IFR et CVFR de chaque composant identifié séparément.



Lateral Separation

Maintain five miles lateral separation, irrespective of the balloon's phase of flight.

Exercise caution at all times because winds aloft can vary greatly.

Be aware that balloon altimeters are permanently set to standard pressure and cannot be adjusted during flight. When at 18 000' and below, consider the local altimeter to determine actual altitude.

Balloon altimeter setting: 29.92" Hg

Variation of 0.10" Hg equals 100'

Espacement latéral

Maintenez un espacement latéral de cinq milles, peu importe la phase de vol du ballon.

Les vents en altitude peuvent varier grandement et vous devez donc faire preuve de prudence en tout temps.

Rappelez-vous que les altimètres de ballons sont réglés en permanence à la pression standard et qu'ils ne peuvent pas être ajustés durant le vol. À 18 000 pieds et moins, utilisez le calage altimétrique local pour déterminer l'altitude réelle du ballon.

Calage altimétrique de ballons : 29,92 po de mercure

Un écart de 0,10 po de mercure équivaut à 1 00 pieds.

Balloon Altimeter Setting : 29.92 Hg/
Calage altimétrique de ballons: 29,92 po de mercure

Ref: TC AIM AIR 1.5 – Pressure Altimeter/
Référence : AIM de TC, section AIR, article 1.5 – Altimètre barométrique

Local Altimeter/ Calage alt. local	**Variation/ Écart**	**Displayed Altitude (feet) Altitude affichée (pieds)**	**Actual Altitude/ Altitude réelle**
29.82	0.10	16,000	15,900
29.87	0.05	16,000	15,950
30.02	0.10	16,000	16,100
30.07	0.15	16,000	16,150

Provide appropriate traffic information to aircraft in the vicinity of balloons.

ACA123 TRAFFIC INFORMATION, 2 O'CLOCK SLOW MOVING LARGE UNOCCUPIED FREE BALLOON LAST REPORTED AT FL400 AND CLIMBING 1000 FEET PER MINUTE, BALLOON AND PAYLOAD APPROXIMATELY 900 FEET TALL.

Do not accept responsibility for separation between a large unoccupied free balloon in any phase of flight and restricted airspace. If you believe a potential safety hazard exists, advise the agency responsible for the restricted airspace.

Non-Surveillance

If identification of an unmanned free balloon is lost or operating in non-surveillance airspace, issue the appropriate traffic information to affected IFR and CVFR aircraft.

Inform the pilot that you are unable to provide conflict resolution, provide as much balloon position information and f reedom of avoidance manoeuvering as the situation permits.

ACA123 UNABLE CONFLICT RESOLUTION DUE TO POSITION OF BALLOON UNCERTAINTY. ADVISE YOUR INTENTIONS.

You may use internet-based readouts to provide flight information.

ACA123 TRAFFIC INFORMATION, LARGE UNMANNED FREE BALLOON, LAST KNOWN POSITION OVER THOMSON, ALTITUDE UNKNOWN.

Continue to track the balloon to the extent that communication with the BSO and surveillance equipment allow, and update flight data at intervals appropriate to the situation.

Fournissez les renseignements appropriés sur le trafic aux aéronefs évoluant dans le voisinage de ballons.

ACA123 INFORMATION SUR LE TRAFIC, DEUX HEURES, GROS BALLON NON HABITÉ SE DÉPLAÇANT LENTEMENT SIGNALÉ POUR LA DERNIÈRE FOIS À FL400 ET EN MONTÉE À 1000 PIEDS PAR MINUTE, BALLON ET CHARGE UTILE D'UNE HAUTEUR D'ENVIRON 900 PIEDS.

N'acceptez pas la responsabilité de l'espacement entre un gros ballon non habité durant toute phase du vol et un espace aérien réglementé. Si vous jugez qu'il existe un risque pour la sécurité, avisez l'agence responsable de l 'espace aérien réglementé.

Absence d'une couverture de surveillance

Si l'identification du gros ballon libre non habité est perdue ou si celui-ci se trouve dans un espace aérien sans couverture de surveillance, transmettez les renseignements appropriés sur le trafic aux aéronefs IFR et CVFR touchés.

Informez le pilote que vous êtes incapable de résoudre le conflit, fournissez le plus de renseignements possibles sur la position du ballon et donnez au pilote le plus de liberté possible pour exécuter des manœuvres d'évitement selon ce que la situation permet.

ACA123 INCAPABLE DE RÉSOUDRE LE CONFLIT EN RAISON DE LA POSITION INCERTAINE DU BALLON. INDIQUEZ INTENTIONS.

Vous pouvez utiliser des affichages d'applications Internet pour fournir l'information de vol.

ACA123 INFORMATION SUR LE TRAFIC, GROS BALLON LIBRE NON HABITÉ, DERNIÈRE POSITION CONNUE AU-DESSUS DE THOMSON, ALTITUDE INCONNUE.

Continuez de pister le ballon dans la mesure où la communication avec le BSO et l'équipement de surveillance le permettent, et mettez à jour les données de vol à des intervalles appropriés pour la situation.

Ensure that affected units/sectors are aware of the balloon status, estimated position, and any AOR penetration time information.

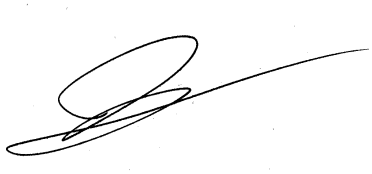
Assurez-vous que le personnel des unités/secteurs touchés est au courant de l'état du ballon, de sa position estimée, et de tout renseignement sur l'heure de pén étration dans le secteur de responsabilité.

Inform your supervisor or manager.

Avisez votre surveillant ou votre gestionnaire.

This memorandum is valid until the procedures are included in MATS.

Cette note de service est en vigueur jusqu'à ce que les procédures soient incorporées dans le MATS.



Jeff Dawson

JD/cf

3. NEW ZEALAND

CHRISTCHURCH AREA SECTOR

Separation

All balloons are equipped with Mode A/C/S (ADS-B transponders) and will be squawking 1300. The transponders are verified for correct altitude by the Launch Team (P&S approved).

Transponder Serviceable – 10 NM Radar Separation—

- Apply **10 NM** radar separation between the balloons and aircraft.

Transponder Not Serviceable – 20 NM Separation Bubble as appropriate—

- Using SkyLine ATM System drawing tool draw a circle of 20 NM (Area Sector) centred on the last position provided by the operator website.
- Keep aircraft clear of 20 NM (Area Sector) bubble.
- No operations permitted below the balloon,
- No operations permitted within 5000ft above the balloon.

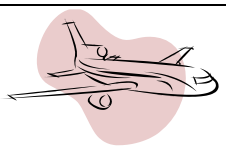
Transit Above or Below the Balloon Bubble

- Aircraft may be cleared to transit vertically above or below a balloon.
- 5000ft vertical separation.

Termination (Cutdown) Transponder working:
10 NM from Balloon,
Above the Balloon: 5000ft
Below the Balloon: NOT Permitted
ADVISE Duty Manager

Termination (Cutdown) Transponder NOT working:
20 NM from Balloon, based on Position from Samsung Tablet
Above the Balloon: 5000ft
Below the Balloon: NOT Permitted
ADVISE Duty Manager

Separation Summary

BALLOON 	AIRCRAFT 
Transponder working	**10 NM** from Balloon Transiting above/below the Balloon **5000ft**
Transponder **Not** Working	**20 NM** from Balloon based on position from Samsung Tablet. Transiting Above the Balloon: **5000ft** Below the Balloon: **not permitted.**
Termination (Cut Down) (transponder working) ADVISE DM	**10 NM** from Balloon Above the Balloon: **5000ft** Below the Balloon: **not permitted**.
Termination (Cut Down) (transponder NOT working) ADVISE DM	**20 NM** from Balloon based on position from Samsung Tablet. Transiting Above the Balloon: **5000ft** Below the Balloon: **not permitted**.

AUCKLAND OCEANIC ATS UNIT ORDERS

Separation

Auckland Oceanic Control Area, class A – OCS – surveillance not available:

BALLOON 	AIRCRAFT 
Clearance Limit given in OCA/A airspace (not cut down or dark* procedures) **a balloon goes "dark" following a total loss of telemetry with the operator*	The circular area created using the balloon's last known position as the center point and the extrapolated + 1 hour position given by the operator as the radius. (OCS will add a 50 NM buffer). Transiting Above the Balloon : 5000ft Below the Balloon: 10000ft
Planned/Unplanned Termination** (Cut Down) ***unplanned cut-downs are considered emergency situations*	The circular area created using the balloon's last known position as the center point and the extrapolated + 1 hour position given by the operator as the radius. (OCS will add a 50 NM buffer). Transiting Above the Balloon : 5000ft Below the balloon: not permitted

Domestic control area, class C airspace – OCR:

BALLOON 	AIRCRAFT 
Transponder working	10 NM from Balloon Transiting Above the Balloon :5000ft Below the Balloon: 5000ft
Transponder Not Working	20 NM from Balloon based on position from Toshiba Laptop. Transiting Above the Balloon : 5000ft Below the Balloon: Not permitted.
Termination (Cut Down) (transponder working)	10 NM from Balloon Transiting Above the Balloon : 5000ft Below the Balloon: Not permitted
Termination (Cut Down) (transponder NOT working)	20 NM from Balloon based on position from Toshiba Laptop. Transiting Above the Balloon : 5000ft Below the Balloon: Not permitted.

Dealing with different Balloon scenarios in AA OCA/A – OCS:

Balloon 	OCS Procedure
Controlled Entry into OCA/A (repositioning) Clearance to descend into OCA/A shall only be issued if there are **no** imminent conflicts within 10,000ft of the balloons lower clearance limit.	Create a circular reservation area using the lowest cleared level of the balloon, then subtract a further 9000ft off that figure (separation is 10000ft) to F600; use the balloon's last known position as the center point and the + 1 hour extrapolated position given by the operator as the radius. The area shall be updated at least hourly. **Orange – advisory conflict** If OCS displays an advisory conflict consider instructing the operator to climb the balloon to at least 10,000ft above the traffic or re-route / descend aircraft clear of the reservation area.
The operator notifies "Balloon has gone Dark' (considered an emergency situation)	Create a circular reservation area from F000 to F600; use the balloon's last known position as the center point and the + 1 hour extrapolated position given by the operator as the radius. The area shall be updated at least hourly, continue to use the last known position as the center of the reservation area (the area will get bigger each update). **RED – Imminent conflict** Issue essential traffic information". **Orange – advisory conflict** If feasible consider re-routing aircraft clear of the reservation area until the balloon has reported or estimated to have landed
Unplanned Termination or Cut Down Advice from the operator balloon has or will terminate within an hour (considered an emergency situation). Balloon self terminates after going "dark" 2 hours if over land or 6 hours if over water.	Create a circular reservation area from F000 to F600; use the balloon's last known position as the center point and the +1 hour extrapolated position given by the operator as the radius. The reservation area shall be updated at least hourly. The separation above the balloon is 5000ft, as the balloon descends the reservation area may be updated to determine separation/traffic information requirements (Altitude readout + 4000ft). Flight level data may be obtained from the operator laptop. **RED – Imminent conflict** Issue essential traffic information. **Orange – advisory conflict** If feasible, consider re-routing aircraft clear of the reservation area until the balloon has reported 5000" below affected aircraft or information received that the balloon has landed

Balloon 	**OCS Procedure**
Planned Termination or Cut Down The operator seeks permission to terminate balloon at a future time.	Create a circular reservation area from F000 to F600; use the balloon's last known position as the centre point and the +1 hour extrapolated position given by the operator as the radius. The reservation area shall be updated at least hourly. The separation above the balloon is 5000ft, as the balloon descends the reservation area may be updated to determine separation/traffic information requirements (Altitude readout + 4000ft). Flight level data may be obtained from the operator laptop. **RED – Imminent conflict** Deny the request to terminate balloon. **Orange – advisory conflict** Resolve conflict prior to it becoming an Imminent conflict or if unable or unexpeditious to resolve Deny the request to terminate until traffic permits.
Balloon unable to maintain height requesting descent/termination with in traffic in near vicinity (considered an emergency situation)	Deny termination/clearance into controlled airspace and obtain the balloons intentions. **Do not issue a clearance** to enter controlled airspace but acknowledge the fact that the balloon is descending and request that the operator advises as soon as it becomes apparent that the balloon will not be able to remain above its clearance limit. Create a circular reservation area from the lowest descent level of the balloon obtained from the operator then subtract a further 9000ft off that figure (separation is 10000ft) to F600; use the balloon's last known position as the center point and the + 1 hour extrapolated position given by the operator as the radius. The area shall be updated at least hourly. **RED – Imminent conflict** Issue essential traffic information to affected flights. **Orange – advisory conflict** If possible consider re-routing aircraft around the reservation area When traffic is clear, assess if the balloon shall be terminated or clearance into controlled airspace granted.

— END —