



SHAPING
OUR
FUTURE
SKIES

canso.org

CANSO ACADEMY:

UNDERSTANDING SPACE LAUNCH AND RE-ENTRY OPERATIONS, INTERNATIONAL COORDINATION NEEDS AND PROCESSES

Wednesday 13 July 2022

15:00 – 17:00 CEST



Mr. Scott Leis

Operations Programme Manager

CANSO



Mr. Lance King

Co-Chair of CANSOs UAS/ET Working Group
Northrop Gruman Corp.

UAS / EMERGING TECHNOLOGIES WORKING GROUP



Mr. Lance King

Co-Chair of CANSOs UAS/ET Working Group
Northrop Gruman Corp.

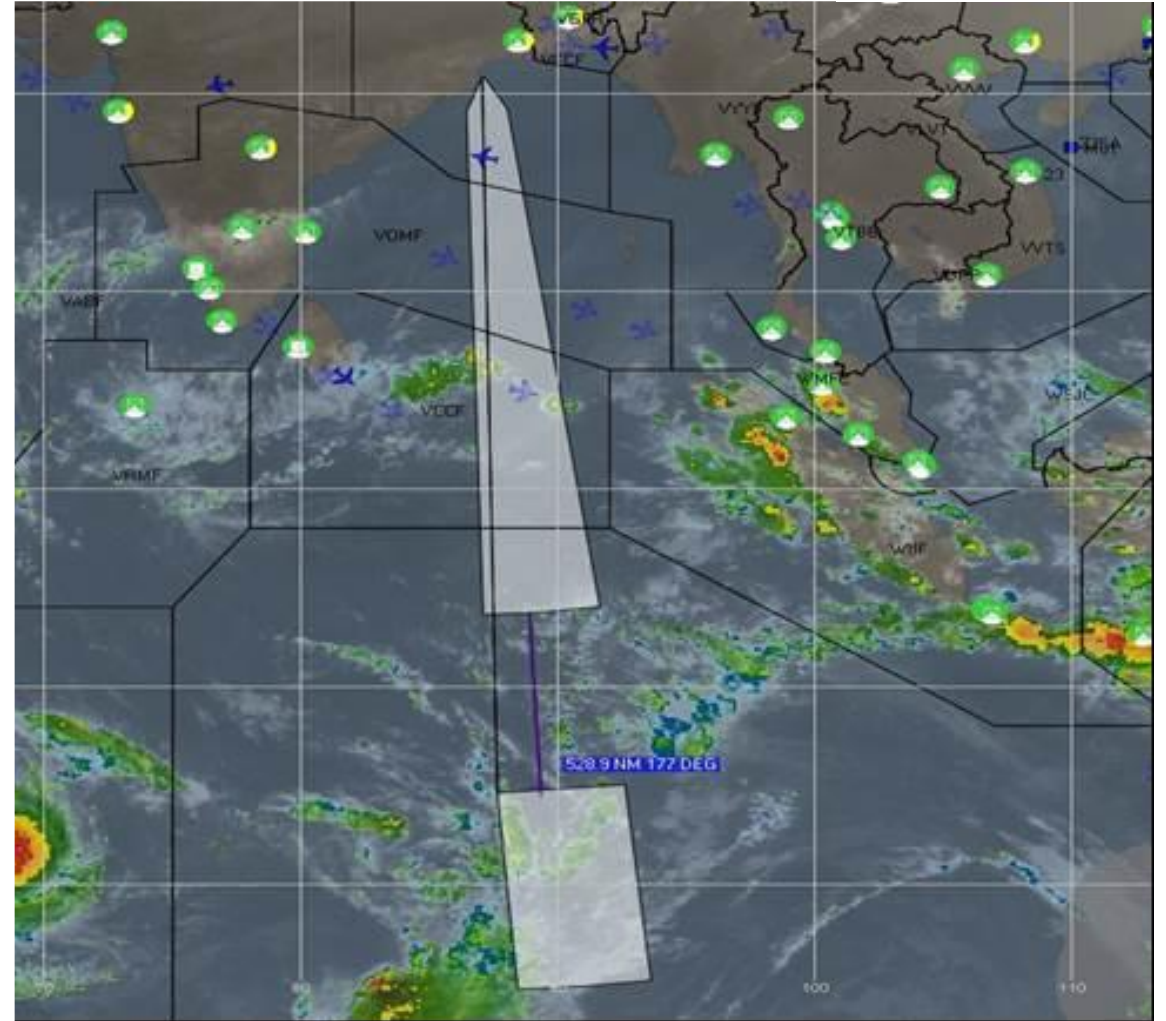


Mr. John Page

Co-Chair of CANSOs UAS/ET Working Group
FAA

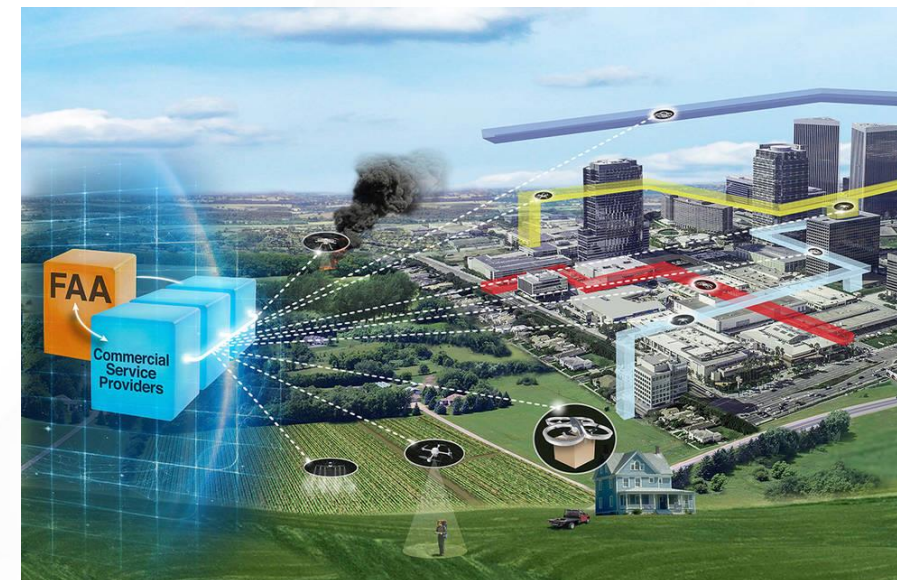
UAS / ET WORKING GROUP

- Born as the Collaborative Airspace WG to help ANSPs navigate government airspace closures for State and military activities.
- As unmanned aircraft activities increased and needed dedicated airspace, the group took on airspace integration efforts for remotely piloted aircraft (RPAS), working with the ICAO RPAS Panel to create operating standards.



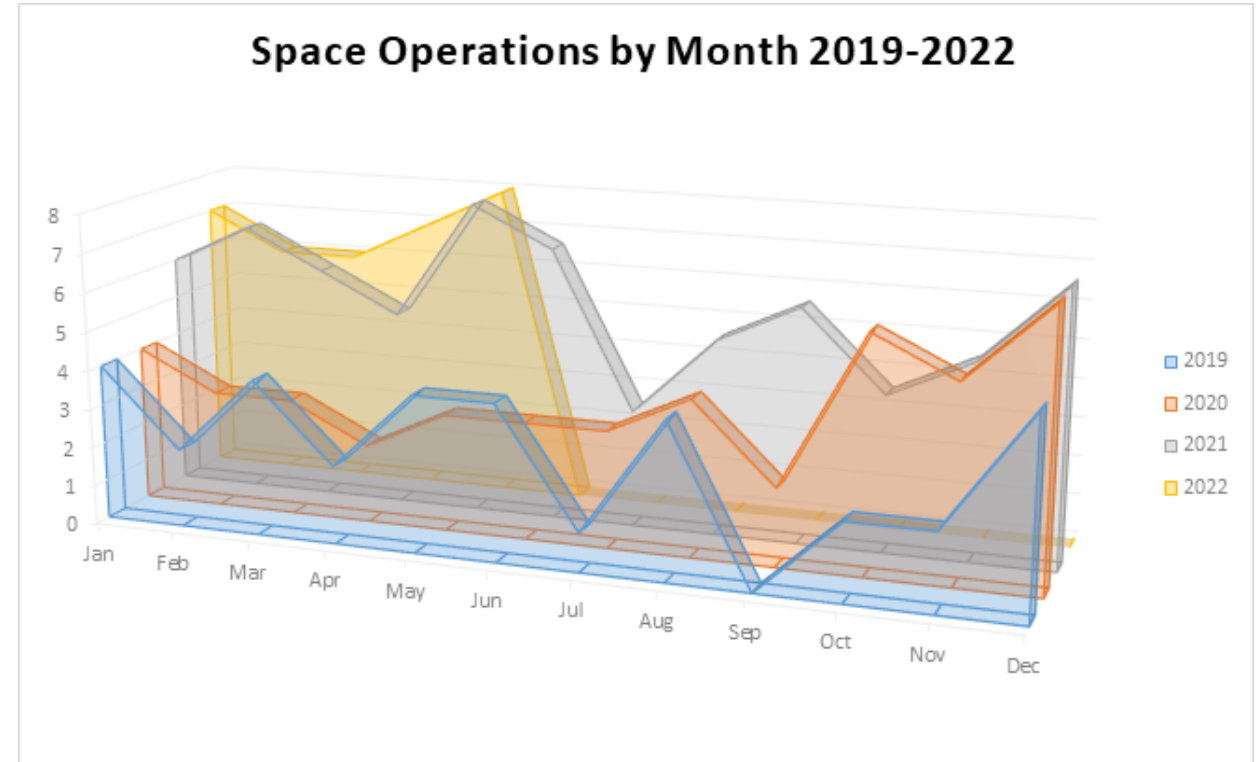
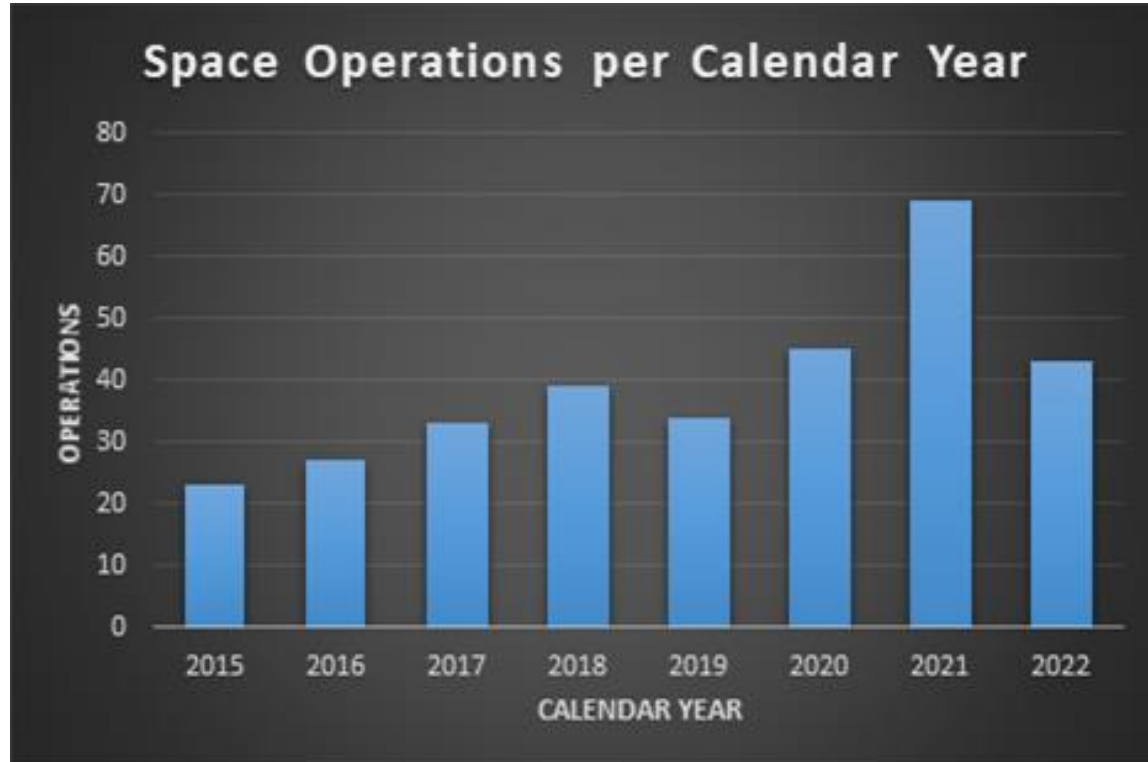
UAS / ET WORKING GROUP

- With the growth of UAS and other technologies demanding access to airspace, we added emerging technologies to our portfolio.
 - UAS and UTM
 - UAS that interact with ANSPs
 - Space Tourism and Transport
 - Launch and Recovery
 - Solar Impulse
 - Around the world at 25kts and FL280
 - Unmanned Balloons
 - Google Loon, tethered balloons/aircraft



UAS / ET WORKING GROUP

- Demand to get to Space is growing.
- CANSO is part of the growth and education process.
- This is a first step to introduce ANSPs to Space Launch and Re-Entry Operations and build an international team to continue the dialogue.





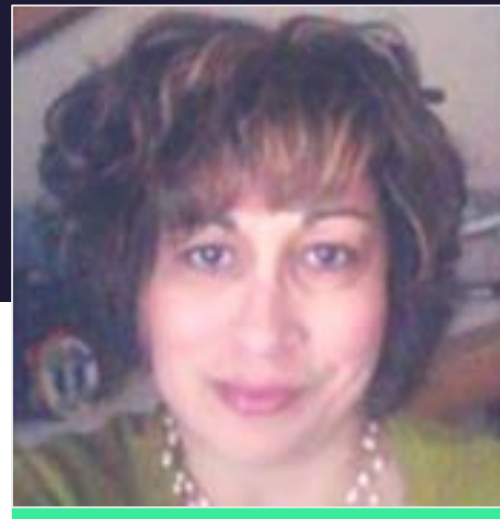
THANK YOU





Ms. Stacey Zee

Operations Support Branch Manager
FAA



Ms. Emily Sisneros

Operational Safety Directorate
FAA



Regulatory and Pre-operational Considerations – Commercial Space Transportation

Prepared for:
CANSO Academy

July 26, 2022



**Federal Aviation
Administration**

FAA Office of Commercial Space Transportation (AST)

Authorizes the FAA to license commercial launch and reentry activities and the operation of launch and reentry sites as carried out by a citizen of the United States

- **AST Mission:** Oversee and enable the safest commercial space transportation system in the world.
- **AST Vision:** We are committed to propelling commercial space transportation safely into the future.

Over **500** licensed and permitted commercial launches and reentries since 1989 without any public casualties or major property damage

[faa.gov/space](https://www.faa.gov/space)



Who Needs a License or Permit?



A U.S. citizen or an entity organized under the laws of the United States or any State must obtain a license:

- To launch or reenter a vehicle *inside* or *outside* the United States;
- To operate a launch or reentry site *inside* or *outside* of the United States;

A Foreign entity that wishes to operate a vehicle or site within United States territory.

An entity may obtain an experimental permit:

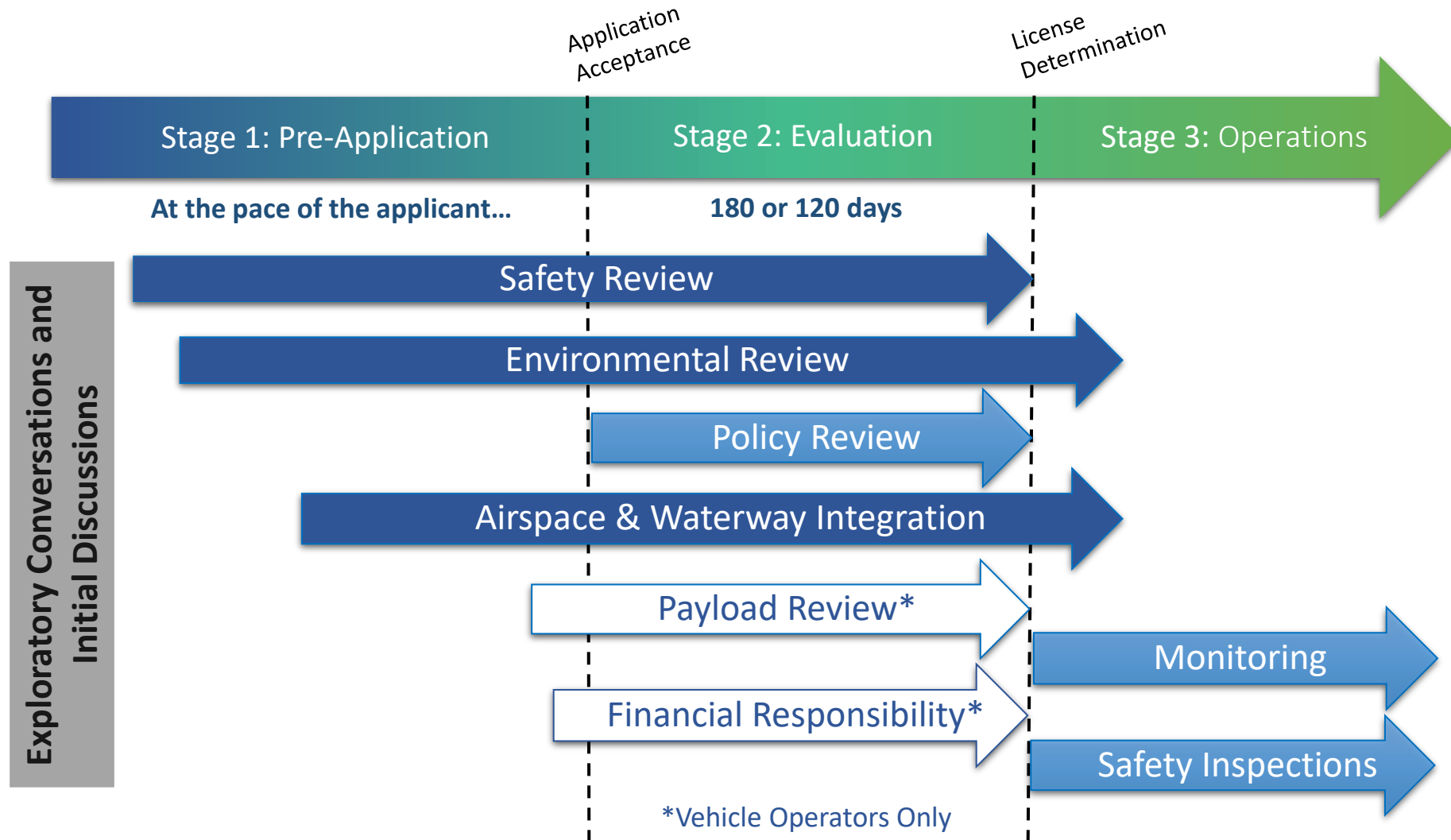
- To launch a reusable suborbital vehicle from the United States for research and development, or prior to obtaining a launch license, to show compliance with requirements for a license or crew training.

FAA does not license launches or reentries “the Government carries out for the Government”:

- NASA and the Department of Defense typically carry out their own launches.

SUMMARY: If the company is U.S incorporated or operated in U.S. territory, it needs authorization.

AST Process– Site/Vehicle Operator License



Aircraft Hazard Areas

- Aircraft hazard areas (AHAs) define the location, extent, and duration of a hazard to other users of the airspace from falling debris generated by a launch or reentry vehicle
- Prior to a mission, the FAA (or a Range) uses physics-based computational tools to model planned hardware jettisons and potential failures of a launch or reentry vehicle at specific points along its trajectory, accounting for uncertainties in vehicle performance, environmental conditions, and other factors
- The tools propagate falling debris to the surface to:
 - Predict the region in which the risk to an aircraft, if present, would exceed acceptable thresholds in part 450
 - Predict the duration of time in which the hazard would exist
- The FAA uses air traffic management tools and techniques to identify these regions for other airspace users and prevent other airspace users from entering them during periods in which the hazard might occur – one such tool is a **Temporary Flight Restriction**

Airspace Requirements

- Applicant develops an LOA (Letter of Agreement) with FAA Air Traffic Control (ATC) facility where the operation will take place
- Letter of Agreement
 - Establishes procedures for the issuance of a Notice to Air Missions (NOTAM)
 - Defines communication between operator and ATC (before, during and after operation)
 - Outlines response to contingencies
- NOTAM
 - Defines the lateral and vertical (altitude) confines of the airspace with the associated dates/time for a launch/reentry operation
 - Must be issued in advance of operations to notify other users of the National Airspace System of the airspace closure



THANK YOU





Ms. Allison Crutchfield

Senior Manager of Regulatory Affairs

SpaceX



Mr. Patrick Giles

Manager, ATM Portfolio - Design & Benefits

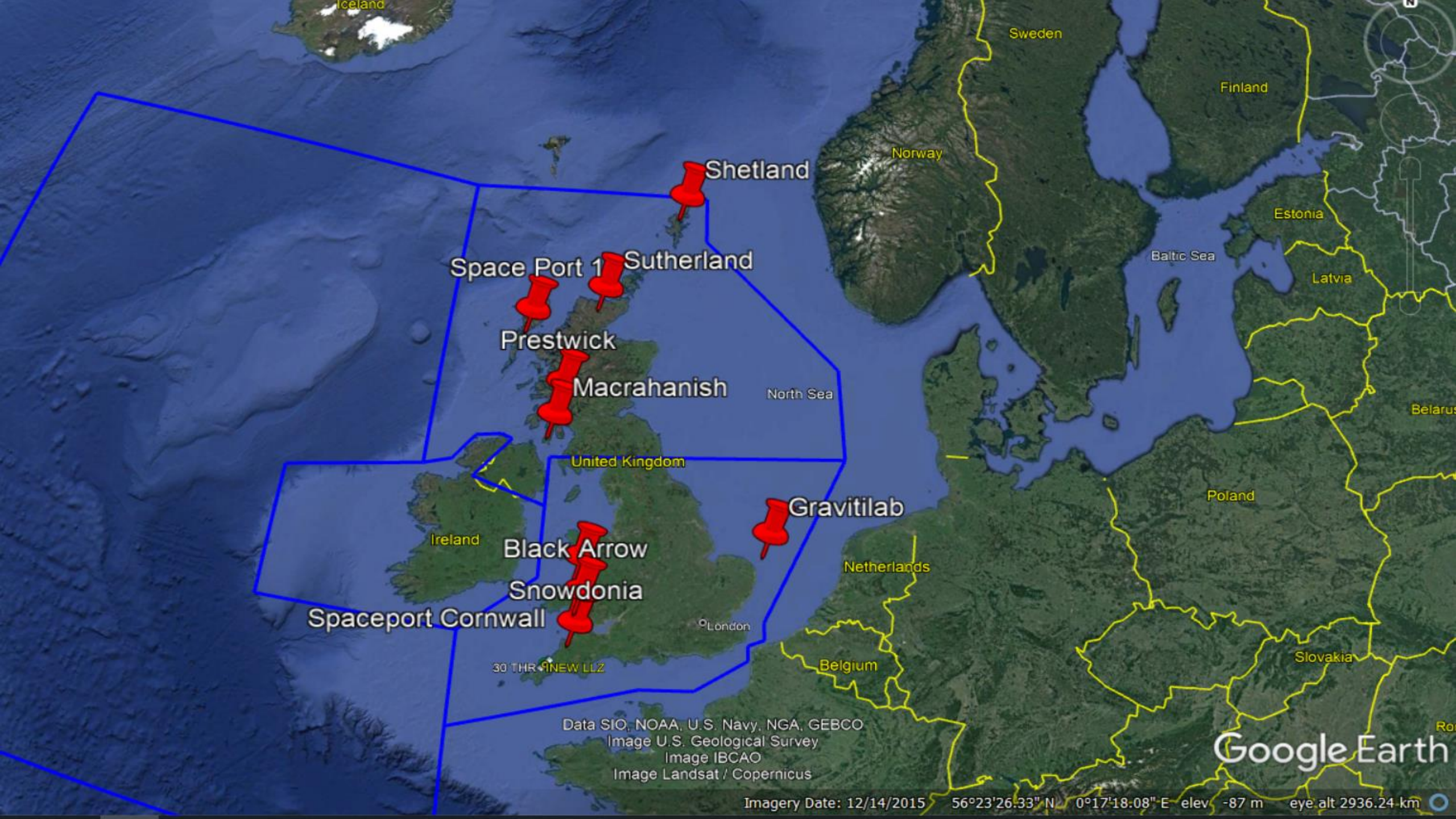
NATS UK

THE NATS EXPERIENCE – COORDINATION IS KEY

CONTEXT OF SPACE LAUNCHES IN THE UK

A New and Growing Sector – but not a “clean sheet” environment

- NATS is in discussion with over a dozen organisations aiming to start providing launch site facilities, or launching rockets, in the UK in the period 2022 - 2025
- UK is a densely populated country, so launch sites are around the coastline, with space launches aimed out to sea
- UK has many close neighbours, so almost any launch will end up crossing an FIR boundary, or more than one
- Recovery areas will thus usually be in a different FIR from the launch area. Some rockets may even cross a boundary before leaving the atmosphere
- Each new FIR/State involved potentially requires additional coordination at Government, Regulator and ANSP level



Shetland

Space Port 1

Sutherland

Prestwick

Macrahanish

North Sea

United Kingdom

Ireland

Black Arrow

Snowdonia

Spaceport Cornwall

Gravitalab

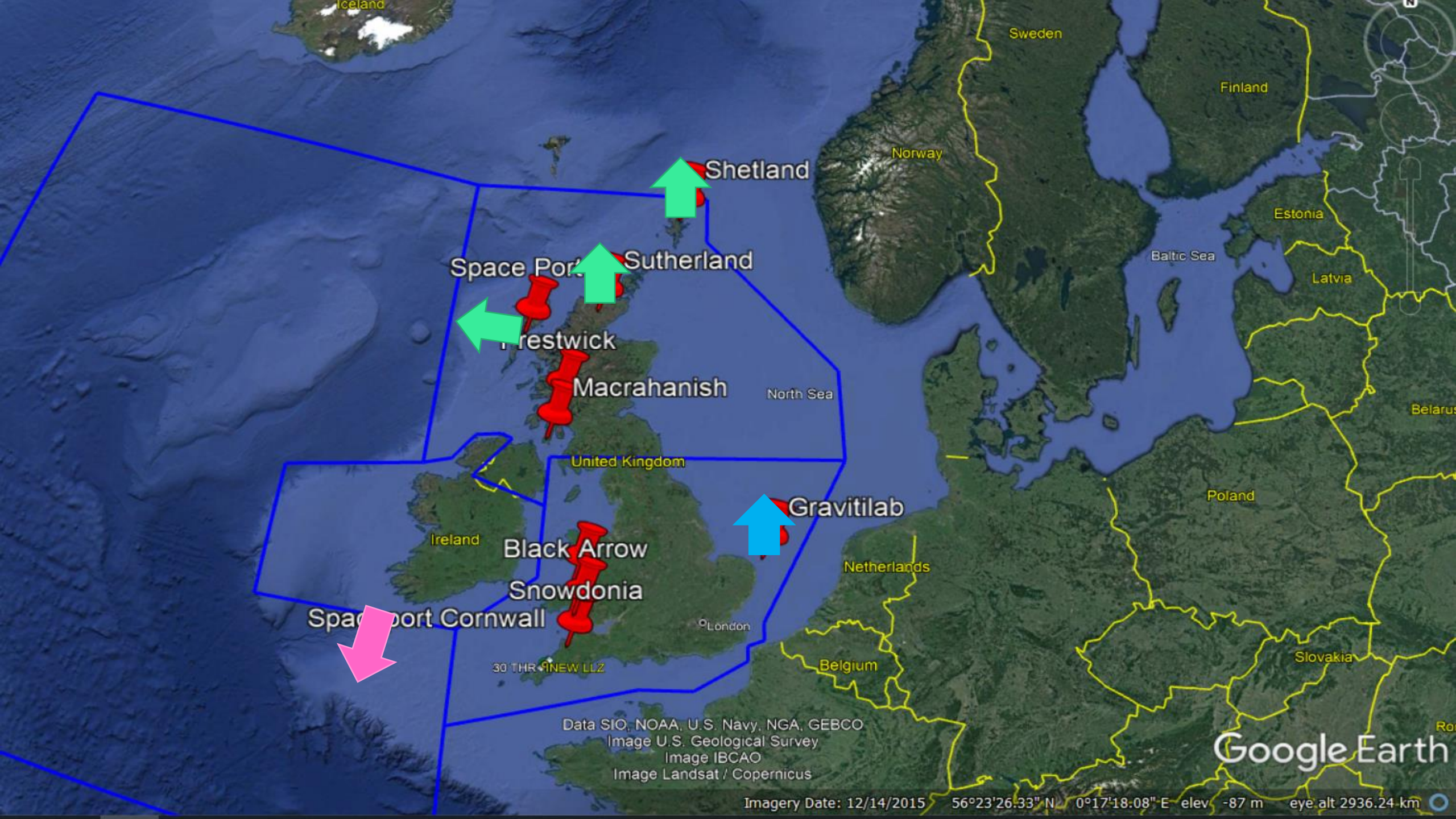
London

30 THR 4 NEW LLZ

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image U.S. Geological Survey
Image IBCAO
Image Landsat / Copernicus

Google Earth

Imagery Date: 12/14/2015 56°23'26.33" N 0°17'18.08" E elev -87 m eye alt 2936.24 km



Shetland

Sutherland

Prestwick

Macrahanish

Gravitilab

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Spaceport Cornwall

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image U.S. Geological Survey
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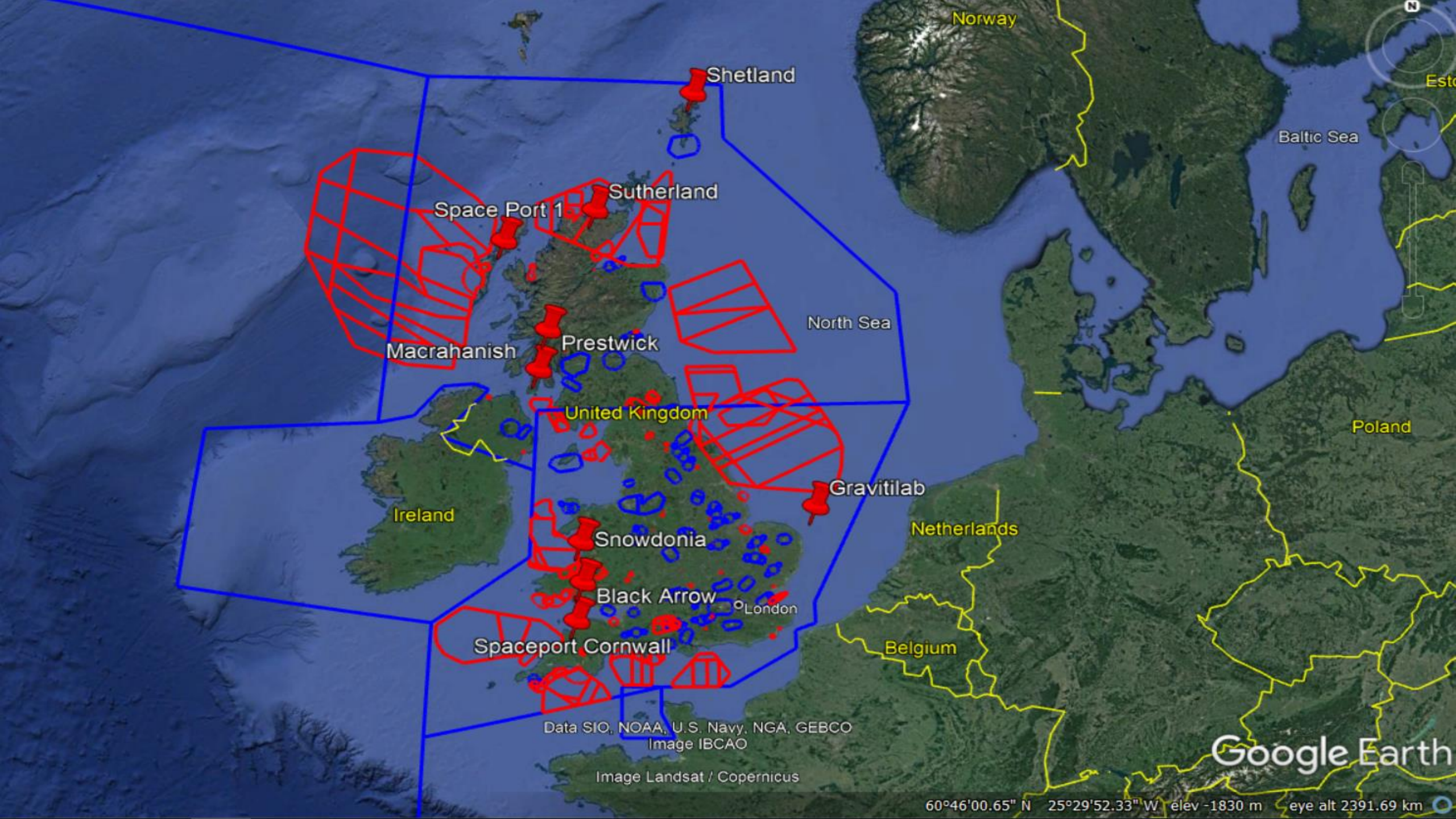
Google Earth

Imagery Date: 12/14/2015 56°23'26.33" N 0°17'18.08" E elev -87 m eye alt 2936.24 km

AIRSPACE IS A SHARED RESOURCE

Space Launches have to operate alongside existing Airspace Users

- Major Civil Airports
- Military Danger Areas – both routine training and major exercises
- En Route airline traffic (and in a Free Route environment there are fewer lines on maps to show where they may be)
- Specialist operations (e.g. police, medivac, search & rescue, oil platform support)
- Sport & Recreation GA (including unpowered and/or non-radio equipped)
- Time of day / day of the week may make a big difference to the level of interaction.
- For air/sea launches, moving just a few miles may radically change the level of interaction



Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image IBCAO

Image Landsat / Copernicus

Google Earth

60°46'00.65" N 25°29'52.33" W elev -1830 m eye alt 2391.69 km

FOR MANY OF US, THIS IS NEW

We don't all have decades of experience

- ANSP staff may not be used to space launches happening locally, nor the fact that they need backup launch days in case of weather or technical issues
- Some Regulators are still setting up their teams and processes but that doesn't mean these can be short-circuited
- Many Launch Sites are new (or haven't yet been completed)
- Many Space Launch companies aren't yet used to dealing with Airspace issues, or are moving into new regions where the rules and procedures are slightly different
- ATM Systems adaptation and Safety work takes time, over and above the rocket/launch approval work – there are very few (if any) shortcuts

COORDINATE EARLY, COORDINATE CONTINUALLY

Until this becomes routine we all need to make extra effort

- ANSPs need to make sure contact points are known to those who need them – both planning and day-of-operation (noting these may be different teams/individuals). Ensure contact lists are complete and up to date
- The Danger Area design, time and length of activation etc may all need multiple adjustments from the initial proposal as new facts are uncovered. This may need iterative discussions with multiple organisations
- Small changes can have big impacts (e.g. oceanic FIRs may have larger separation requirements than domestic FIRs)
- There may be interaction with other activities (not necessarily even space/airspace) which add constraints
- We collectively need to remain alert until every part of the launch vehicle returned to earth (or has been confirmed to be in orbit)



THANK YOU





Ms. Hannah Browne

Air Traffic Control Specialist, ATO Space Operations

FAA



Commercial Space Notice to Air Missions (NOTAM) Coordination

13/07/2022



Introduction

Federal Aviation
Administration (FAA) Air
Traffic Organization (ATO)
Space Operations



NEED FOR CHANGE

ATO Space Ops and CANSO ATFM Data Exchange Network (CADENA) have been coordinating via email. New procedures will allow for:

- Reduces workload
- Faster processing
- Leverages existing infrastructure
- No longer completing operational coordination via email
- Eliminates manual processing



Pre Mission Planning

#1

#2

#3

Why does operational coordination start at L-10 days?

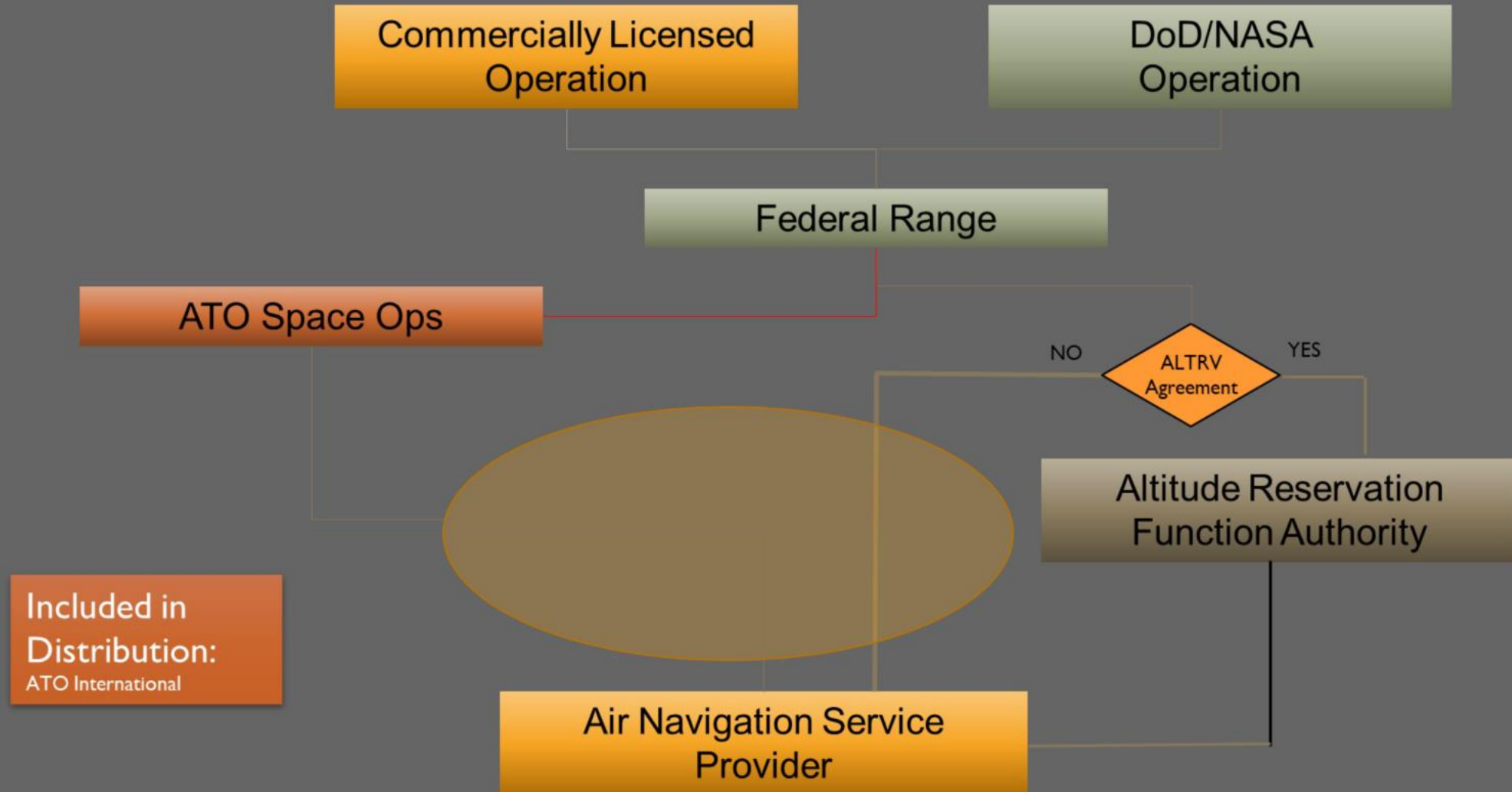
Operation Planning Timeline



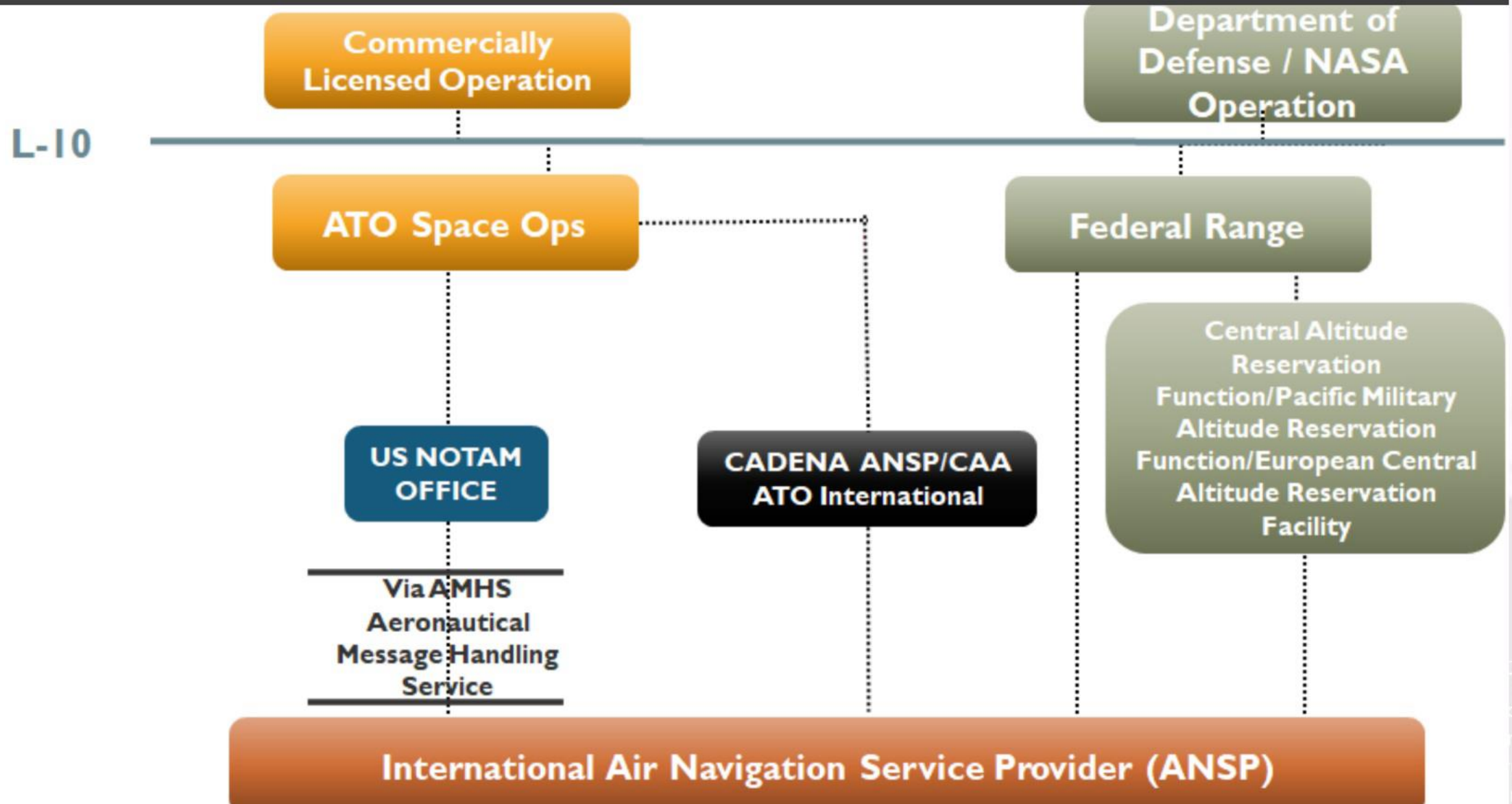
Initial launch request from Federal Range

Key differences in coordination of commercial and military operations

LEGACY PROCESS



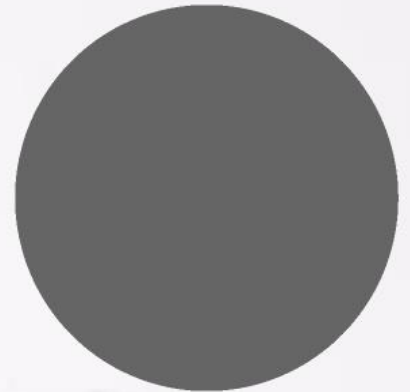
PROPOSED PROCESS



Fiji Beta Test



- Federal Aviation Administration Air Traffic Organization Space Ops, U.S. NOTAMs Office, Fiji, and ATO Intl
- Validated AHMS to coordinate international NOTAMs
- Identify shortfalls
- Discuss proposed solutions



3 TEST SCENARIOS

- Scenarios tested:
 - Approval
 - Denial
 - Amendment
- Initial request contain primary and five backup dates
- Begin requesting additional backup days no less than 72 hours prior to the last coordinated day
- Request NO DRAFT NOTAM as part of initial request
- Fiji encourages communication via AMHS rather than email

**Working together to develop common
solutions**



Questions?



Ms. Kalesi Samanunu Cagi

AIS Coordinator Information Support

Fiji Airports

PREVIOUS PROCESS & DOCUMENTED PROCEDURE

- No coordination (back and forth coordination)
- Notification message received on AFTN from USNOF containing the following:
 - *Coordinates of the boundary/location of where the re-entry will take place*
 - *Estimate times at which the re-entry will occur*
- Extract information and plot affected area. Obtain information of affected ATS routes or part thereof
- Coordinate and obtain approval from our CAA for establishment of a temporary restricted Area at the boundary of re-entry
- Issue NOTAM to advise airlines
- On the day, ATC monitors the area and alert aircraft of any potential danger



IMPROVED COORDINATION PROCESS

- The improvement of the coordination process was initiated by FAA through their Air Traffic Representative in the Asia/ Pacific, Michael Watkins in February 2022
- We, Fiji Airports and our CAA attended the first zoom meeting which was facilitated by Mr. Watkins and also attended by other FAA colleagues on the same month
- Hannah Brown, from ATO Space Operations explained and proposed the best possible coordination process that was intended to implemented
- Fiji Airports requested a test/trial run of the proposed improved coordination process since the process was a significant change to our then documented procedures



TEST OF PROPOSED PROCESS

- The Tabletop Exercise procedures was prepared by ATO Space Operations which included the participation of USNOF, ATO Space Ops, Nadi International NOTAM office (NFOF) and AJV-1
- The test was conducted on the 7th April 2022 and was called off due time difference issue. Test recommenced and was completed on the 8th of April
- The purpose of the Tabletop Exercise was to validate the National Airspace Data Interchange Network (NADIN) system as means to coordinate NOTAMs for international launch and reentry operations, for both the USNOF and NFOF.
- Findings from the exercise were used to develop and refine international NOTAM coordination procedures and also your local procedures



CONTENTS OF TEST

Fiji Test Tabletop Exercise

Assessment of Need

FAA ATO Space Operations is proposing utilization of the NADIN system to complete the coordination of international NOTAMs in support of launch and reentry operations. The codification of procedures regarding these activities will require the validation of the NADIN system through the FIJITEST exercise. Key stakeholders including the US NOTAM Office (USNOF), Fiji (NFOF), and ATO Space Ops will have the opportunity to simulate coordination for an operation, which will enhance familiarization of procedures for all parties and provide the opportunity for feedback on any shortfalls not previously assessed.

Scope

- USNOF will test coordinating requests with NFOF for FIJITEST Exercise
- Location: Virtually, and via NADIN
- Participants: USNOF, ATO Space Ops, NFOF, AJV-I

Purpose Statement

The purpose of the FIJITEST Tabletop Exercise is to validate the NADIN system as a means to coordinate NOTAMs for international launch and reentry operations, for both the USNOF and NFOF. Findings from this exercise will be used to develop and refine international NOTAM coordination procedures.

Objectives

- Validate NADIN as an official means of coordinating international NOTAMs for commercial space launch and reentry activities.
- Identify shortfalls with the proposed system and procedures.
- Discuss proposed solutions to develop the most streamlined system for all stakeholders.

Anticipated Outcomes

- USNOF will become familiar with NOTAM format for space launch and reentry operations
- USNOF will develop best practices for coordination with Fiji and ATO Space Ops
- Fiji will develop best practices for coordination with USNOF

ACTIVITY LOG OF TEST-SCENARIO 1

Scenario 1

In this scenario, USNOF, ATO Space Ops, and NFOF will coordinate NOTAM publication as though requests are approved and launch occurs nominally, with backups cancelled prior to the end of the reservation.

- USNOF sends NOTAM request to Fiji via NADIN – FIJITEST
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- Fiji will reply-all to the request with approval
- Fiji will publish the FIJITEST NOTAM
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- ATO Space Ops will notify USNOF of successful mission via email
- USNOF will send Fiji cancellation request
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- Fiji will remove FIJITEST NOTAM
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST|TEST” at the beginning and end of the request

Scenario 1

Time	Action	Remarks
1615	TEST MESSAGE FROM USNOF RECEIVED	VIA AFTN
1619	TEST MESSAGE FROM USNOF RECEIVED	VIA AFTN
1639	ACKNOWLEDGE MESSAGE SENT	VIA AFTN
2041	REQUESTED CAAF APPROVAL FOR DANGER AREA NOTAM	VIA EMAIL
2040	RECEIVED CAAF APPROVAL FOR DANGER AREA NOTAM	VIA EMAIL
2107	CAAF APPROVAL SENT	VIA AFTN SENT TO USNOF AND US SPACE OPS
2107	NOTAM ISSUED AND SENT VIA AFTN	VIA AFTN SENT TO USNOF AND US SPACE OPS

ACTIVITY LOG OF TEST-SCENARIO 2

Scenario 2

In this scenario, USNOF, ATO Space Ops, and NFOF will coordinate NOTAM publication. Fiji will deny the initial request and propose different dates for the FIJITEST2 operation.

- USNOF sends NOTAM request to Fiji via NADIN – FIJITEST2
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- Fiji will reply-all to the request with denial
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- USNOF advises ATO Space Ops of NOTAM denial
- ATO Space Ops coordinates new launch window with USNOF
- USNOF sends Fiji amended request
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- Fiji replies all and publishes FIJITEST2 NOTAMs
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request

Scenario 2

Time	Action	Remarks
1850	TEST SCENARIO 2 MESSAGE RECEIVED	VIA AFTN
1854	TEST MESSAGE RECEIVED	VIA EMAIL
1854	ACKNOWLEDGE MESSAGE SENT	VIA AFTN
1858	REQUESTED CAAF FOR ESTABLISHMENT OF DANGER AREA	VIA EMAIL
1903	RECEIVED APPROVAL FROM CAAF	VIA EMAIL
1911	DENIAL MESSAGE SENT	VIA AFTN TO USNOF AND US SPACE OPS AFTN ADDRES
2014	RECEIVED TEST MESSAGE WITH REVISED TIME	VIA AFTN
2020	REQUESTED CAAF APPROVAL FOR REVISED TIMES	VIA EMAIL
2027	RECEIVED APPROVAL FROM CAAF	VIA EMAIL
2029	TEST NOTAM FOR SCENARIO 2 SENT	NOTAM NUMBER A1000/22 VIA AFTN TO USNOF (INCORRECT QCODE)
2033	TEST NOTAM FOR SCENARIO 2 SENT	NOTAM NUMBER A1000/22 VIA AFTN TO US SPACE OPS (INCORRECT QCODE)
2050	RECEIVED TEST COMPLETE CANCEL NOTAM A1000/22	VIA EMAIL FROM US SPACE OPS
2059	SENT CANCELLATION NOTAM A1001/22	NOTAM NUMBER A1001/22 CANCELLATION VIA AFTN TO US SPACE OPS AND USNOF
2101	SENT CANCELLATION NOTAM	VIA EMAIL

ACTIVITY LOG OF TEST-SCENARIO 3

Scenario 3

In this scenario, USNOF, ATO Space Ops, and NFOF will coordinate NOTAM publication of additional backup dates, simulating a launch that has slid.

- USNOF sends NOTAM request to Fiji via NADIN – FIJITEST3
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- Fiji will reply-all to the request with approval
- Fiji will publish (on a test string?) the FIJITEST3 NOTAM
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST TEST” at the beginning and end of the request
- ATO Space Ops will submit request to USNOF for additional backup dates
- USNOF will send Fiji new request
 - When transmitting NOTAM request through AMHS, include the text: “TEST TEST|TEST” at the beginning and end of the request
- Fiji will reply all with approval

Scenario 3

Time	Action	Remarks
2130	TEST SCENARIO 3 MESSAGE RECEIVED	VIA AFTN
2133	ACKNOWLEDGE MESSAGE SENT	VIA AFTN
2136	REQUESTED CAAF FOR ESTABLISHMENT OF DANGER AREA	VIA EMAIL
2138	RECEIVED APPROVAL FROM CAAF	VIA EMAIL
2140	APPROVAL MESSAGE SENT	VIA AFTN TO USNOF AND US SPACE OPS AFTN ADDRES USNOF:KDCAYNYX SPACE OPS: KATCAJRX
2142	NOTAM ISSUED A1002/22 ON TEST	VIA AFTN
2202	RECEIVED NEW REQUEST FOR ENTRY	VIA AFTN
2205	ACKNOWLEDGED	VIA AFTN
2209	REQUESTED CAAF APPROVAL	VIA EMAIL
2212	CAAF APPROVAL RECEIVED	VIA EMAIL
2213	APPROVAL FOR TEST SENT	VIA AFTN TO USNOF AND US SPACE OPS
2213	TEST NOTAM ISSUED A1003/22 REVISING A1002/22	AFTN ADDRES USNOF:KDCAYNYX SPACE OPS: KATCAJRX

RESULTS OF THE TEST

- Fiji was able to understand the coordination process
- Able refine and document a new coordination process which in turn established a more convenient intra State coordination with our CAA and other stakeholders
- The NFOF was established as a main point of contact during such activity
- From the test we learnt that we were able to deny a request for re-entry and we have established a procedure that denial of such request shall only arise if area calculated or proposed for re-entry is:
 - *On land or too close to land; or*
 - *In a dense air traffic area*
- Established a cordial coordination process with FAA
- USNOF became more familiar with our NOTAM format and advance notification requirements



EXPECTATIONS FOR SPACE LAUNCH

- Establish an effective communication mechanism for such activities
- Strategic coordination conducted between the State civil aviation authority prior to the activity and tactical management of the launch/reentry activity
- Advance notification prior to confirmation of launch
- Consideration and continued coordination with the originators of the launch if original re-entry boundary has been declined by the affected State
- Harmonization of coordination between States with originating Space Shuttle launches with affected States

THANK YOU





Ms. Camille Baker

Manager, USNOF

FAA

SPACE OPERATIONS REQUEST TO USNOF

ATO Space Operations will:

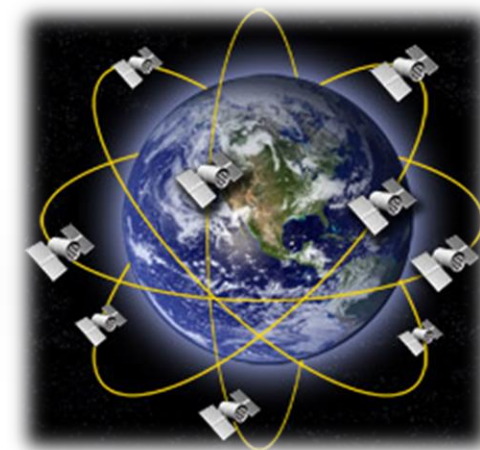
- Send message to USNOF with the following information:
 - a) Launch name
 - b) Applicable FIR(s) – ID and AFTN address
 - c) Conflict advisory
 - d) Confirm receipt and request response to KATCAJRX

USNOF MESSAGE TO FOREIGN ANSP

Upon message from Space Ops, USNOF will:

- Send AFTN message to specified Air Navigation Service Provider (ANSP) with information from ATO Space Operations message, to include NOTAM request.

*Note: The same steps will be followed for NOTAM cancellations or reissuance.



AFTN MESSAGE – 1ST EXAMPLE

NOTAM Request

SUBJ: NOTAM REENTRY APREQ for FALCON 9 STARLINK 4-19 stage 2 REENTRY

****THIS REQUEST IS FOR UPPER STAGE REENTRY **** Hazardous Area WEST of MEXICO

Request NOTAM for TAHITI (NTTT):

1. SpaceX will be conducting hazardous operations surface to unlimited for atmospheric re-entry and splashdown of launch vehicle upper stage within the following areas.

AREA: 1419S 13527W

0330N 12316W

0330N 12055W

1522S 13352W to beginning

AFTN MESSAGE – CONTINUED

NOTAM Request

2. Hazard periods for STARLINK 4-19 Second Stage REENTRY:

Primary REENTRY day:	17 Jun 22 / 1550Z thru	17 Jun 22 / 1753Z
Backup REENTRY day (1):	18 Jun 22 / 1528Z thru	18 Jun 22 / 1731Z
Backup REENTRY day (2):	19 Jun 22 / 1506Z thru	19 Jun 22 / 1709Z
Backup REENTRY day (3):	20 Jun 22 / 1445Z thru	20 Jun 22 / 1648Z
Backup REENTRY day (4):	21 Jun 22 / 1423Z thru	21 Jun 22 / 1626Z
Backup REENTRY day (5):	22 Jun 22 / 1402Z thru	22 Jun 22 / 1605Z
Backup REENTRY day (6):	23 Jun 22 / 1340Z thru	23 Jun 22 / 1543Z

3. Please advise of scheduling conflicts ASAP to POC.

4. Please confirm receipt to both sender and POC.

5. POC is ATO Space Operations International email at 9-AJO-AJR-SpaceOps-Intl@faa.gov

AFTN MESSAGE – 2ND EXAMPLE

NOTAM Request

UNITED STATES OF AMERICA FAA ATO SPACE OPS NOTAM REENTRY REQUEST FOR FALCON 9
STARLINK 4-19 STAGE 2 REENTRY

ATTENTION: TAHITI FIR (NTTTZQZX)

REQUEST:

1. PLEASE ISSUE A NOTAM FOR FALCON 9 STARLINK 4-19 STAGE 2 REENTRY HAZARDOUS AREA
2. PLEASE ADVISE OF SCHEDULING CONFLICTS ASAP TO BOTH POC KAJRYFYX AND USNOF KDCAYNYX.
3. PLEASE CONFIRM RECEIPT OF THIS REQUEST TO BOTH POC KAJRYFYX AND USNOF KDCAYNYX.

LOCATION: WEST OF MEXICO

WI AN AREA DEFINED AS 1419S13527W 0330N12316W 0330N12055W 1522S13352W TO POINT OF
ORIGIN

TIME PERIOD FOR HAZARD: JUNE 17 2022 1550 UTC UNTIL JUNE 23 2022 1543 UTC

NOTAM EXAMPLE

XXXXX/22 NOTAMN

Q)
NTTT/QWMLW/IV/BO/W/000/999/0501S08640
E400

A) NTTT

B) 2206171550 C) 2206231543

D) 2206171550 TO 2206171753

2206181528 TO 2206181731

2206191506 TO 2206191709

2206201445 TO 2206201648

2206211423 TO 2206211626

2206221402 TO 2206221605

2206231340 TO 2206231543

E) ROCKET LAUNCH WILL TAKE PLACE

FLW RECEIVED FROM GOVERNMENT OF
UNITED STATES OF AMERICA:

HAZARDOUS OPS WILL BE CONDUCTED FOR
ATMOSPHERIC RE-ENTRY AND

SPLASHDOWN OF LAUNCH VEHICLE
STARLINK 4-19 WI THE FOLLOWING AREAS:

1419S 13527W

0330N 12316W

0330N 12055W

1522S 13352W TO BEGINNING

PRIMARY LAUNCH 220617

BACKUP AS PER FIELD D

F) SFC G) UNL



THANK YOU





Mr. Javier Vanegas

Latin American and Caribbean Regional Director

CANSO

A thick white curved line starts from the right edge of the slide and arcs towards the left, passing behind the main title text.

ENHANCING ATM AND SPACE OPERATIONS IN THE LATIN AMERICA AND CARIBBEAN REGION

“The LoA promotes communication, collaboration, and coordination between the participating ANSPs and ATO Space Ops, with information shared among participating CADENA ANSPs and stakeholders for the purpose of enhancing aviation safety”



LETTER OF AGREEMENT

EFFECTIVE: DECEMBER 3, 2020

SUBJECT: CANSO ATFM DATA EXCHANGE NETWORK FOR THE AMERICAS (CADENA) SPACE LAUNCH AND RECOVERY PROTOCOLS

The participating CADENA Air Navigation Service Providers (ANSPs) and the Federal Aviation Administration (FAA) Air Traffic Organization (ATO) Space Operations office (ATO Space Ops) enter into this Letter of Agreement (LOA) to facilitate the safe and efficient movement of space launch and recovery between and through participating ANSP flight information regions (FIRs).

1. PURPOSE: The purpose of this LOA is to facilitate the safe and efficient movement of space launch and recovery operations between and through participating ANSP FIRs. This LOA promotes communication, collaboration, and coordination between the participating ANSPs and ATO Space Ops regarding space launch and recovery operations. The information shared among participating CADENA participating ANSPs and stakeholders is for the sole purpose of aviation safety.

2. SCOPE: This agreement establishes a common regional, cross-border air traffic management (ATM) communications protocol, a seamless operational atmosphere that incorporates common operating procedures and practices, and a performance reporting and review structure and process. The operations described herein are for use by participating CADENA ANSPs and ATO Space Ops to provide space launch and recovery information. This LOA is a non-binding regional operational agreement and is not intended to replace any local agreements or any other LOAs between participating ANSPs.



CADENA PROCEDURES MANUAL



Civil Air Navigation Service Organisation Air Traffic Flow Management Data Exchange Network for the Americas

CADENA Air Traffic Flow Management and
Collaborative Decision Making Procedures Manual

October 31, 2019
Version 5



7 CADENA and Innovation

CADENA recognizes the importance of innovation in the aviation industry and is committed to continually setting new challenges for the team, adding new entrants, and making positive changes that benefit the LAC region stakeholders.

7.1 Space Launch and Recovery

CADENA acknowledges the importance of the operational integration of commercial space operators into the CADENA regional ANSPs and airline operators. Cape Canaveral Space Force Station located on Florida's central Atlantic coastline is the primary launch site for the United States Eastern Range with multiple, adjacent CADENA FIRs. Space operations are growing rapidly with launches occurring from Vandenberg Air Force Base, CA; Mojave Air and Space port, CA; Pacific Spaceport Complex, AK; Kennedy Space Center, FL; SpaceX, Boca Chica, TX; Wallops Flight Facility, VA. Helping to ensure operational safety throughout the global airspace system during launches and recoveries is of primary importance to CADENA.

To that end, CADENA works in partnership with the FAA's ATO Space Operations at the Air Traffic Control System Command Center (ATCSCC) to help promote operational safety and efficiency during space launches and recoveries through the implementation of the following procedures.

7.1.1 Procedures

SPACE OPERATIONS AND ATM CDM

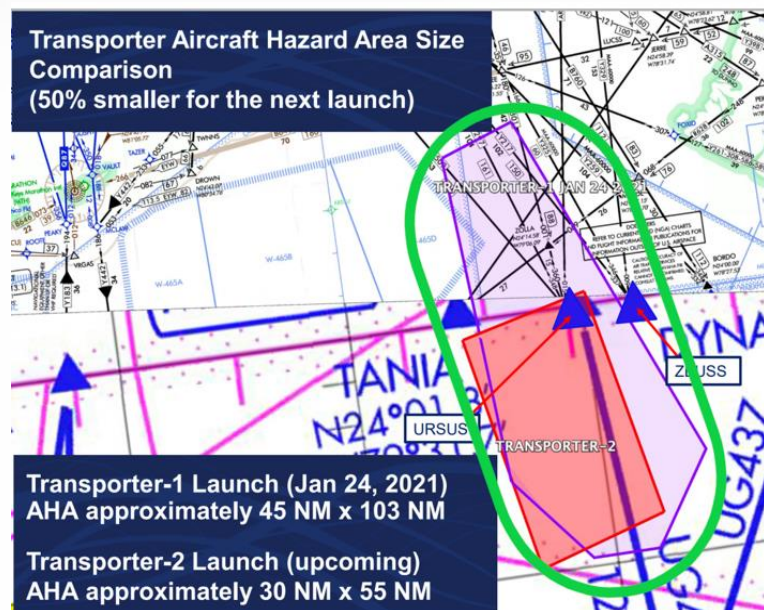


Figure A. Transporter Launch Aircraft Hazard Area (AHA)

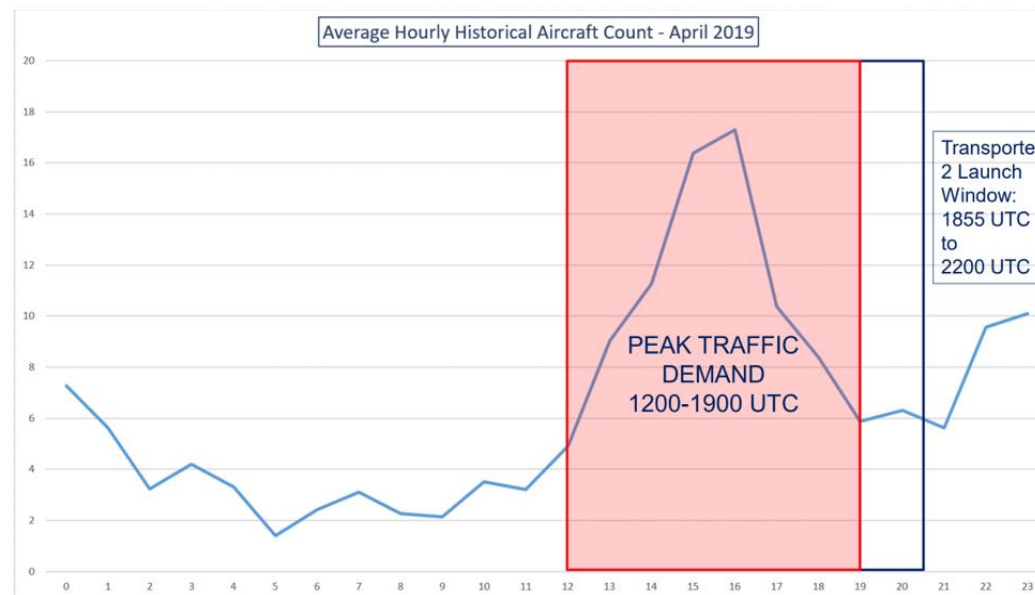


Figure B. Historical Peak Traffic 2019

The Space operations Collaboration Decision Making (CDM) teleconferences reduced the SpaceX polar launch aircraft hazard area (AHA) and active times for Transporter 2. The improvements with relation Transporter 1 mission include a new hazard area 50% smaller, allowing critical airways usage to the east of the hazard area. The active times were also rescheduled to after peak traffic hours of 15-1900 UTC, mitigating impacts to traffic flow.

CADENA OPERATIONS PLANNING WEB CONFERENCE

CADENA



FAA Space Operations Office
David J Hurley Air Traffic Control Center

UPCOMING LAUNCH EVENT

Cape Canaveral Space Force Station (CCSFS),
Florida

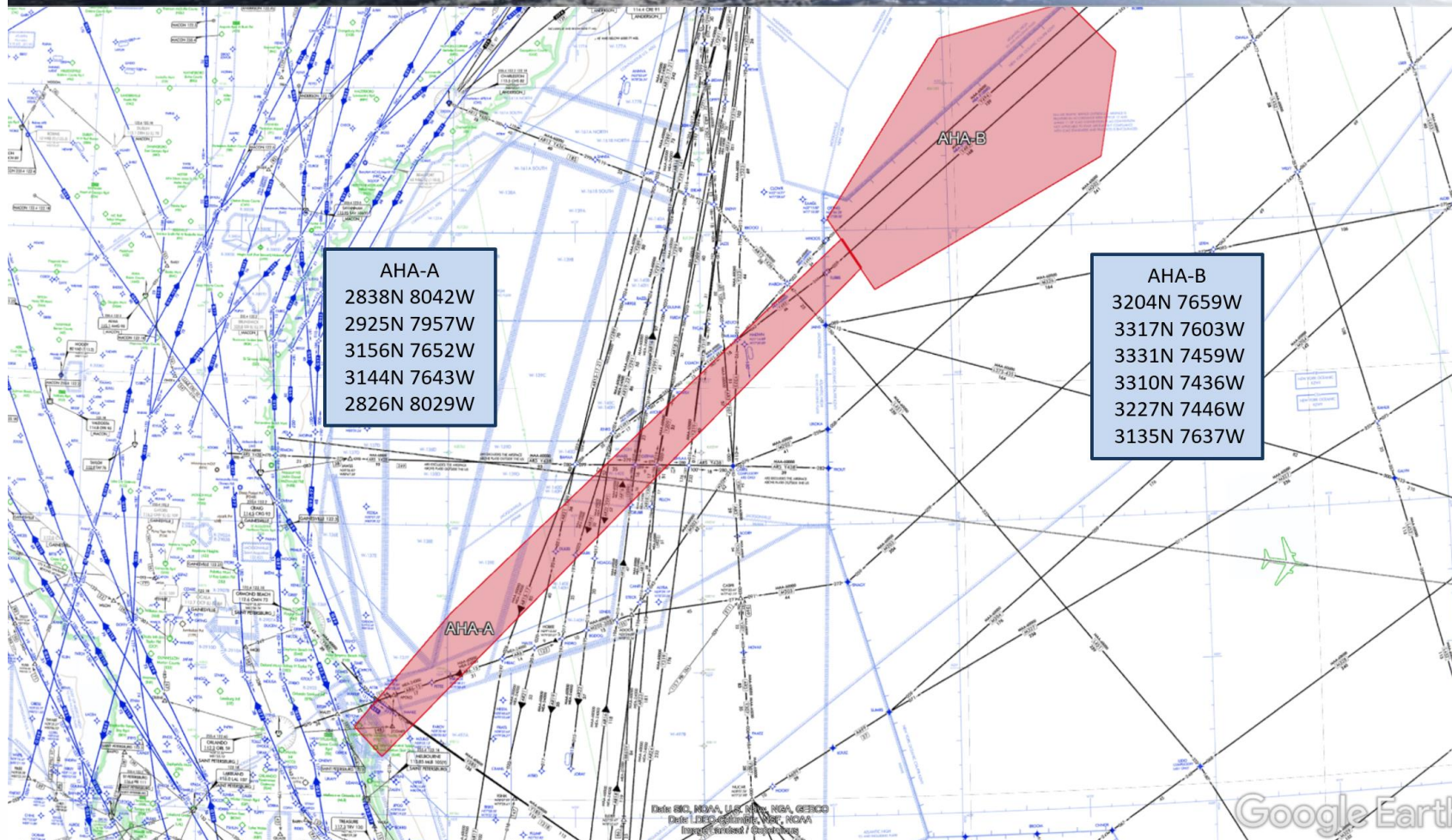
Starlink 4-21, SpaceX Falcon 9

Primary Launch date:
July 07, 2123-2342 UTC

Backup dates:
July 08–13, Varying Times

LAUNCH SITE –Cape Canaveral, Florida







Aircraft Hazard Areas - AHA Coordinates

2ND Stage
1419S 13527W
1456N 11519W
1353N 11344W
1522S 13352W

Primary REENTRY day:	07 Jul 22 / 2233Z thru 08 Jul 22 / 0056Z
Backup REENTRY day (1):	08 Jul 22 / 2212Z thru 09 Jul 22 / 0034Z
Backup REENTRY day (2):	09 Jul 22 / 2150Z thru 10 Jul 22 / 0013Z
Backup REENTRY day (3):	10 Jul 22 / 2128Z thru 10 Jul 22 / 2351Z
Backup REENTRY day (4):	11 Jul 22 / 2107Z thru 11 Jul 22 / 2329Z
Backup REENTRY day (5):	12 Jul 22 / 2045Z thru 12 Jul 22 / 2308Z
Backup REENTRY day (6):	13 Jul 22 / 2024Z thru 13 Jul 22 / 2247Z

CENTRE SPATIAL GUYANAIS

Port spatial de l'Europe
Europe's Spaceport

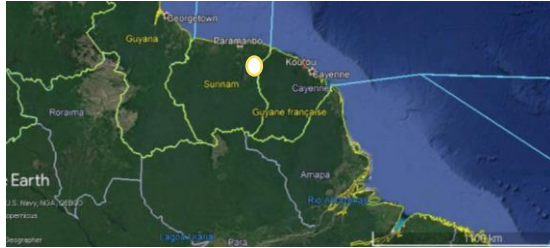


DEPARTMENT OF FLIGHT SAFETY

16/06/2022



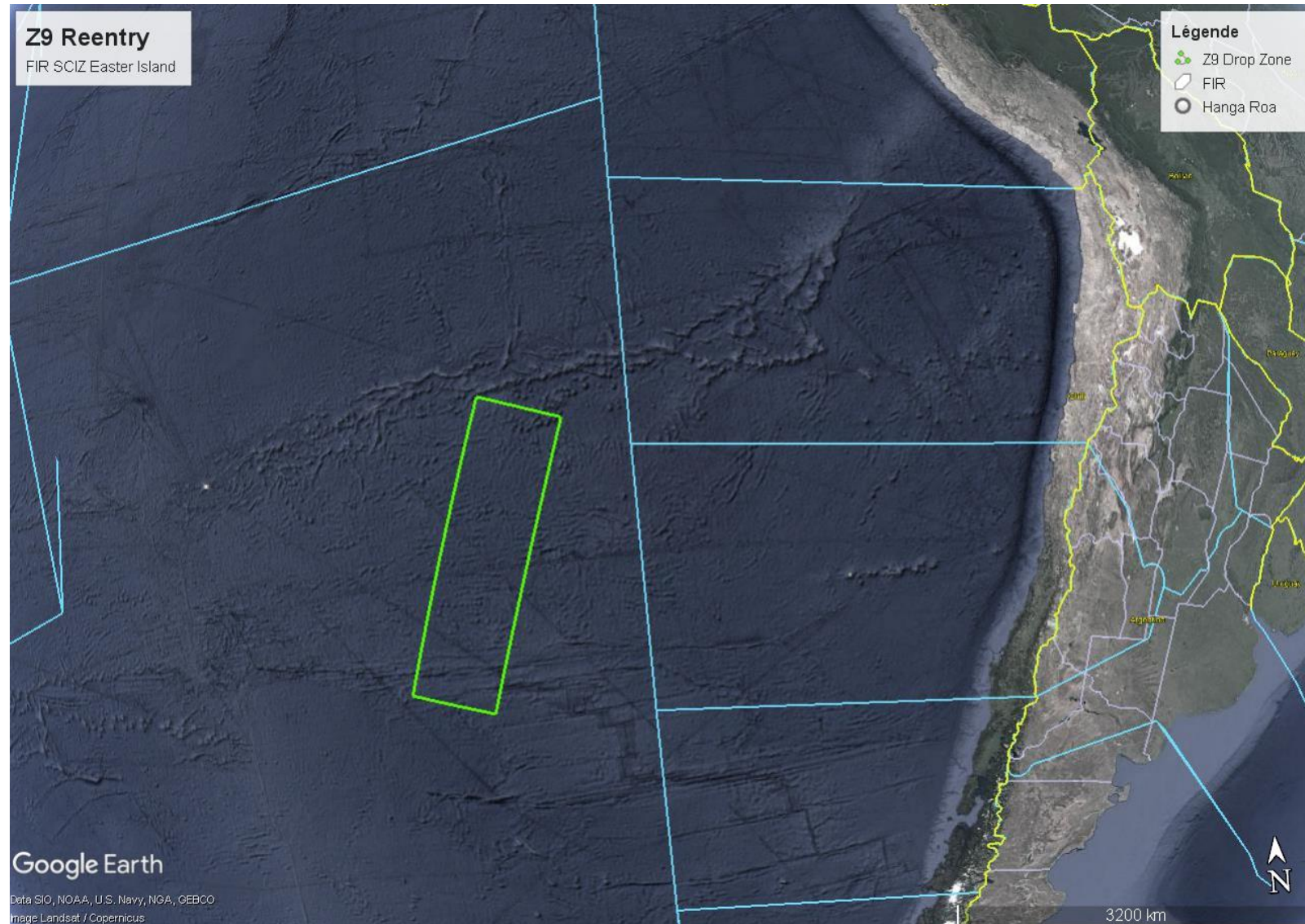
Upcoming Launch



- French Guiana Space Center (CSG),
FRENCH GUIANA
- **VEGA-C VV21 Maiden Flight UPDATE**
- **July 13th, 11:13:17 UTC, 2 Hours
Launch Window**



Third Stage Drop - ZD



Coordinates

A – 3647S 10132W

B – 2605S 09612W

C – 2715S 09247W

D – 3757S 09741W

SCIZ

July 13th through August 12th

Activation times every day from
1300 UTC to 1617 UTC

Last Stage Re-entry - ZE

NO RE-ENTRY OF LAST STAGE

CENTRE SPATIAL GUYANAIS

Port spatial de l'Europe
Europe's Spaceport



UPCOMING LAUNCHES:

- VEGA-C VV21 – July 13th 2022
- Ariane 5 VA258 – mid. September 2022
 - VEGA-C VV22 – November 2022
- *Ariane 6 Maiden Flight – 1st quarter 2023*





THANK YOU





QUESTIONS AND ANSWERS



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THANK YOU

