

RASMAG/26 WP/12

Vertical Safety

Monitoring Report

Pacific and Incheon Airspace

CALENDAR YEAR 2020

Presented to: RASMAG/26

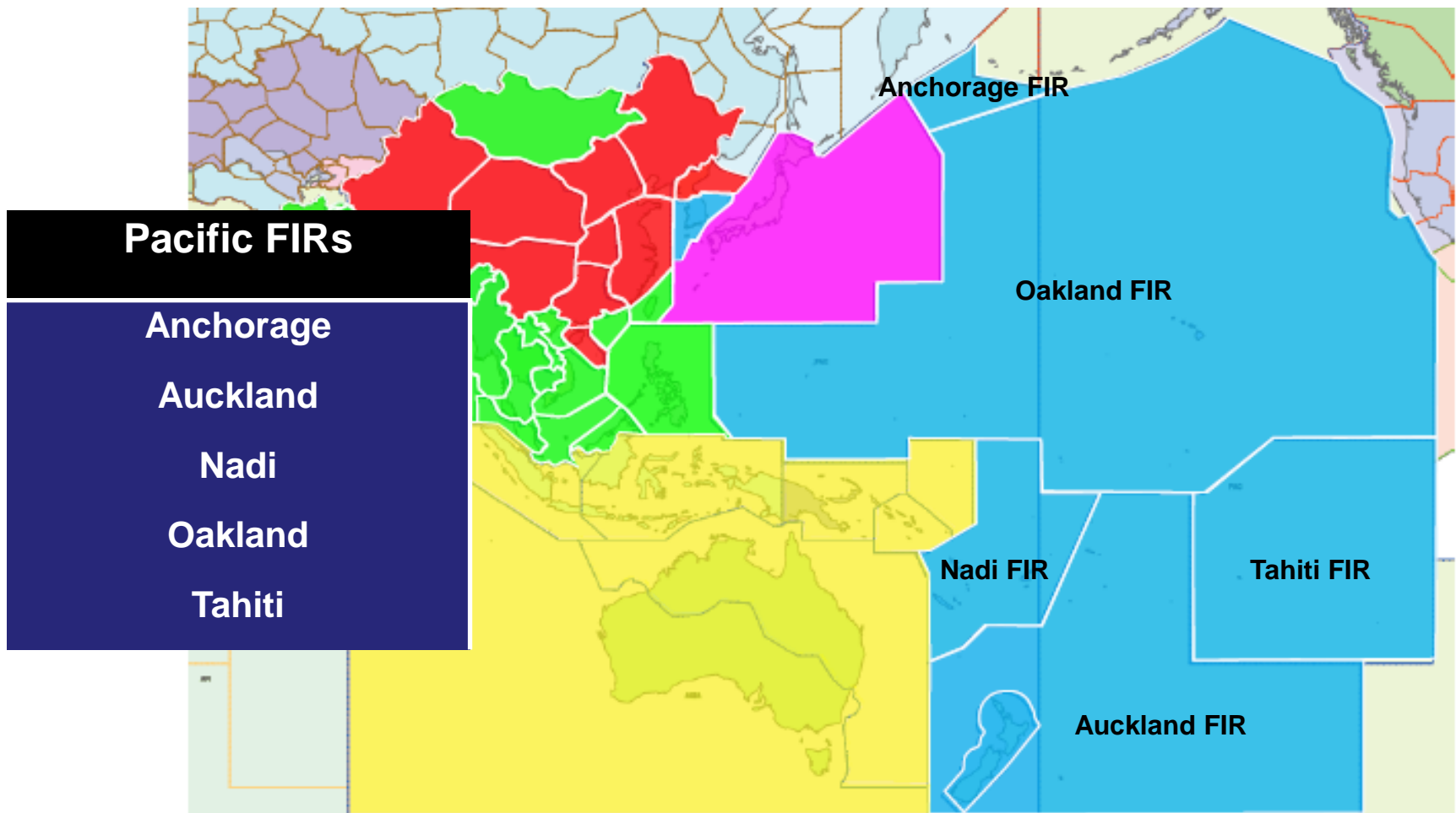
By: PARMO

Date: 20 - 23 September 2021



**Federal Aviation
Administration** 1

Pacific Airspace



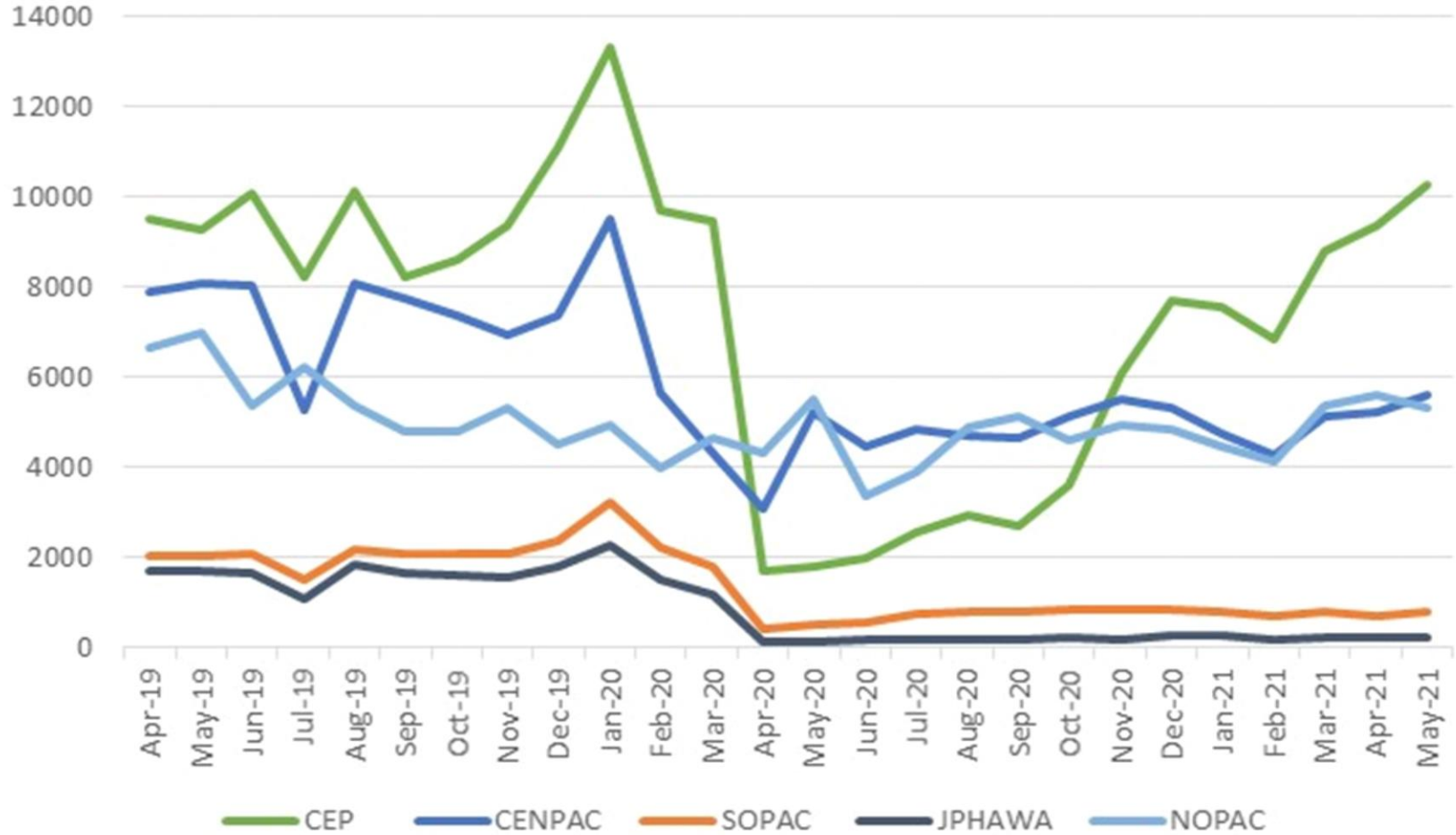
Pacific Airspace: Traffic Flows

Sub-Region of Pacific	Flow	Description of Flow
North Pacific	North Pacific (NOPAC)	North America west to Japan/Korea/beyond plus Japan/Korea to and from Alaska and beyond
	Central Pacific (CENPAC)	Japan/Korea/other Asian origins east to North America
	Central East Pacific (CEP)	North American mainland to and from Hawaii
	Hawaii/Japan (JPHAWA)	Japan/Korea to and from Hawaii
	Japan/Guam (JPGUAM)	Japan/Korea to and from Guam/Saipan/other proximate destinations
	Other (OTHER)	All other North Pacific flights not covered above
South Pacific and Pacific trans-equatorial	Australia/New Zealand/South Pacific States (AUSNZSP)	Australia to and from New Zealand; Australia to and from South Pacific island states; New Zealand to and from South Pacific states
	Nadi (NADI)	Fiji to and from all airports except those in Australia or New Zealand
	Australia-New Zealand/Japan (AUSNZJP)	Australia to and from Japan/Korea; New Zealand to and from Japan/Korea
	South Pacific (SOPAC)	Australia to and from airports in northern hemisphere; New Zealand to and from airports in northern hemisphere

Table 4 in the attachment to WP12



Number of Flights per Month by Traffic Flow



*Figure 5 in WP12 attachment



Reported LHDs – Pacific Airspace

Figure 1 in WP12 attachment

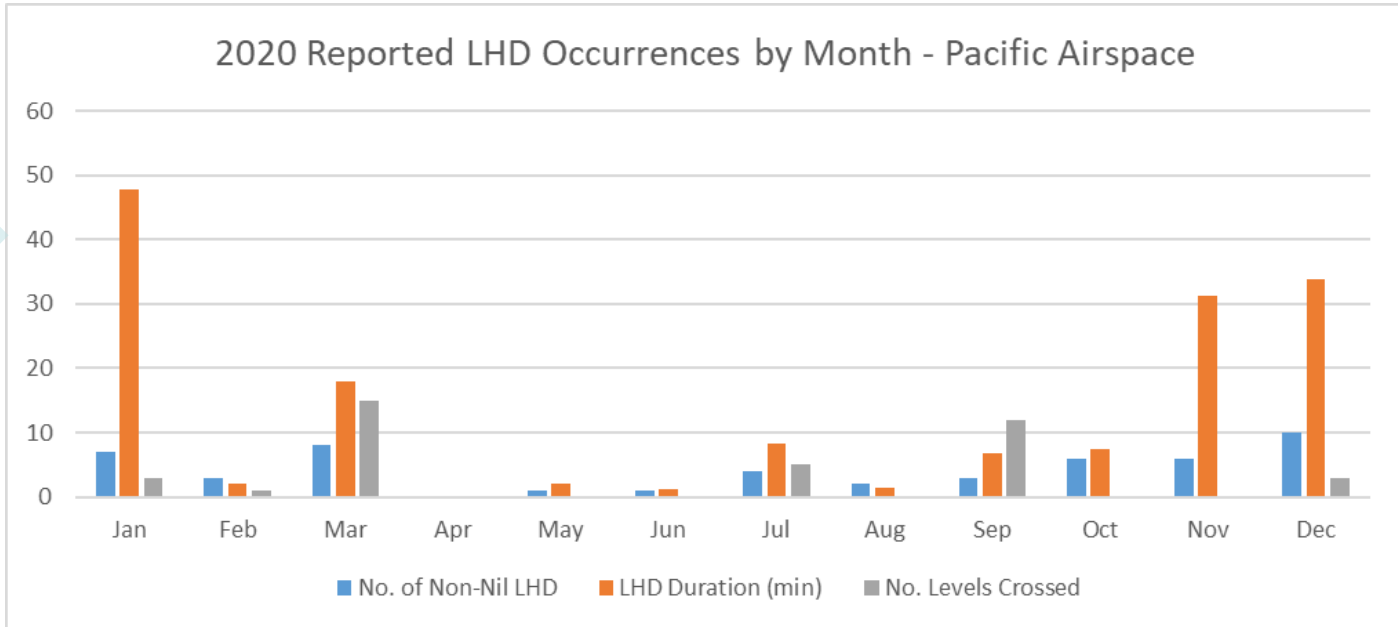
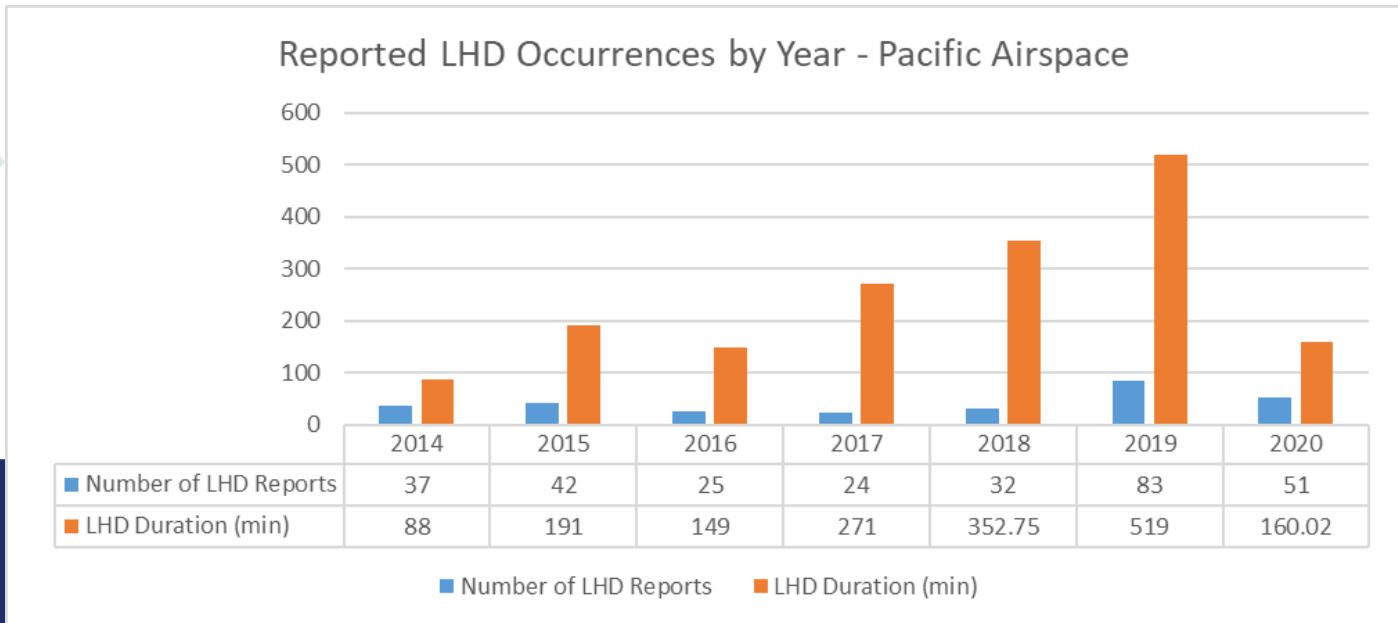


Figure 2 in WP12 attachment



Pacific Airspace - Reported LHDs

Code	LHD Category Description	Count	Duration (Min)	Levels Crossed
A	Flight crew failing to climb/descend the aircraft as cleared;	1	1	0
B	Flight crew climbing /descending without ATC clearance;	9	21.35	16
D	ATC system loop error;	3	12	8
E	Coordination errors in the ATC-unit-to-ATC-unit transfer of control responsibility as a result of human factors;	27	80.67	4
F	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues;	1	33	0
G	Aircraft contingency event leading to sudden inability to maintain assigned flight level (e.g. pressurization failure, engine failure);	3	0	9
I	Turbulence or other weather related causes	5	2	2
M	Other	2	10	0
	Totals	51	160.02	39

*taken from Table 5 in WP12 attachment



Pacific Airspace – Duration of reported LHDs

Traffic Flow	A	B	D	E	F	G	I	M	Grand Total
AUSNZJP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AUSNZSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CENPAC	0.0	3.4	0.0	1.0	0.0	0.0	0.0	0.0	4.4
CEP	1.0	18.0	0.0	68.1	0.0	0.0	0.0	10.0	97.1
HAWJPN	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0
JPNGM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NADI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOPAC	0.0	0.0	7.0	0.0	33.0	0.0	0.0	0.0	40.0
OTH	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	6.1
SOPAC	0.0	0.0	5.0	5.5	0.0	0.0	0.0	0.0	10.5
Grand Total	1.0	21.4	12.0	80.7	33.0	0.0	2.0	10.0	160.0

*Table 6 in WP12 attachment



Pacific Reported LHDs 2020

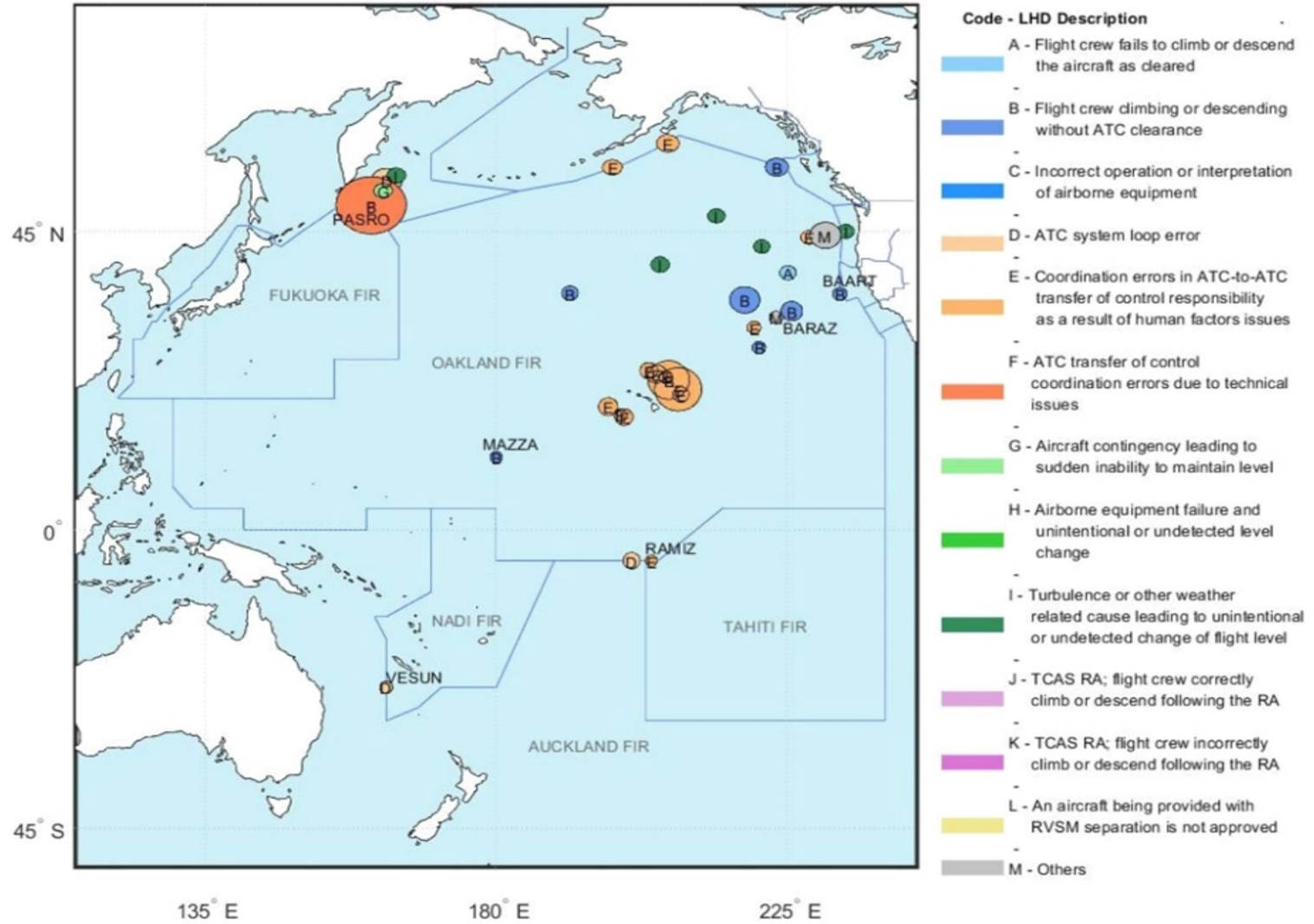


Figure 2 in WP12 (also Figure 6 in WP12 attachment)



Pacific Airspace - Reported LHDs

- **Longest duration for a reported LHD in 2020 was 33 minutes, category F, within NOPAC traffic flow in January 2020 (paragraph 3.5.1 in WP12 attachment)**
- **Most frequent LHD report were category E occurrences between Oakland and Honolulu Control Facility (HCF)**
 - 64 reported category E LHDs; 22 had duration greater than zero minutes



Oakland – HCF Category E LHDs

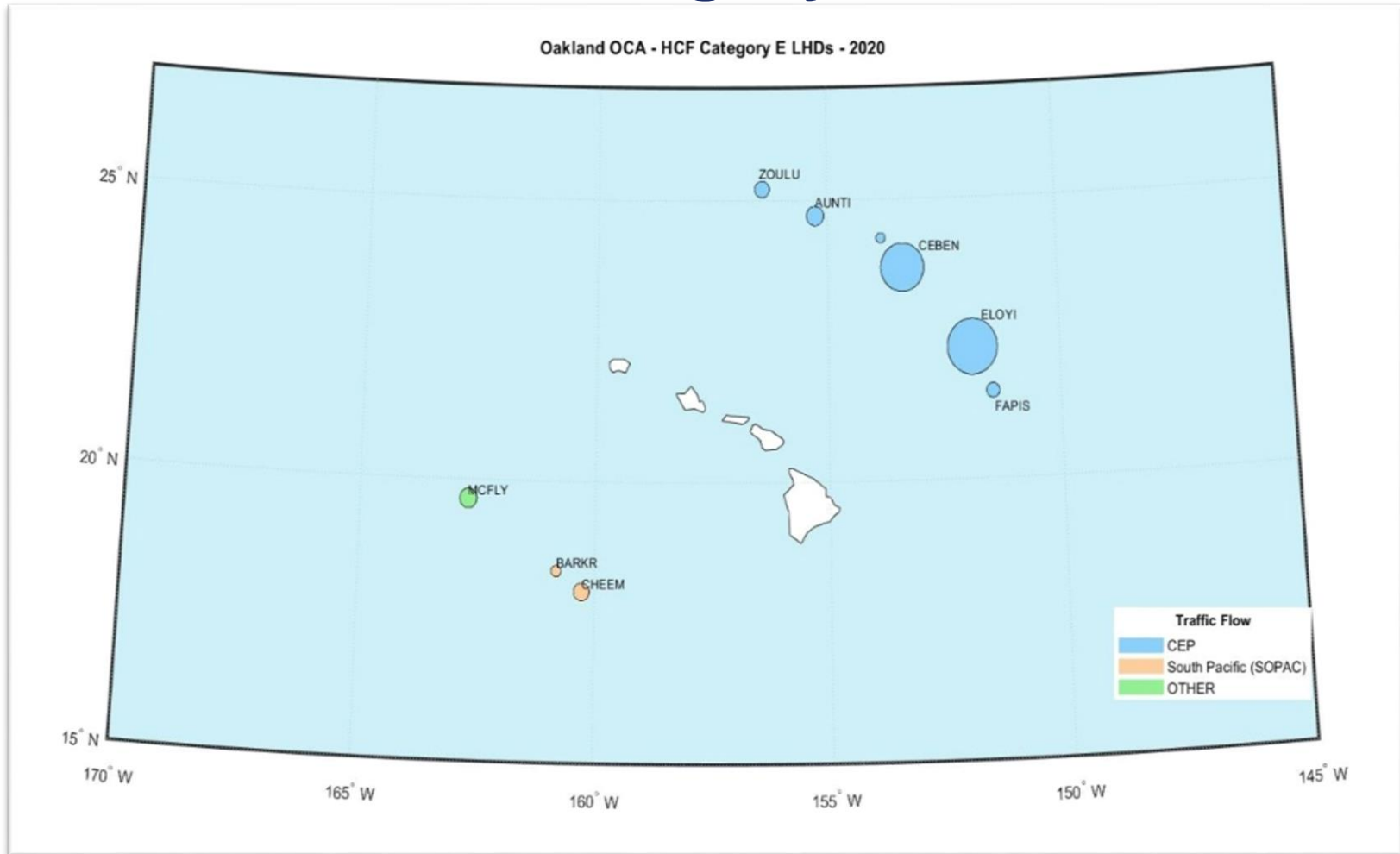


Figure 4 in WP12 attachment)



Pacific Airspace – Vertical Risk Estimate

Pacific Airspace – estimated annual flying hours = 858,079 hours (note: estimated hours based on Dec 2020 traffic sample data)			
Source of Risk	Risk Estimation	TLS	Remarks
<i>RASMAG 25 Total Risk</i>	31.41×10^{-9}	5.0×10^{-9}	<i>Above TLS</i>
Technical Risk	0.08×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	21.96×10^{-9}	-	-
Total Risk	22.04×10^{-9}	5.0×10^{-9}	Above TLS

- **Total vertical risk estimate without the Oakland – HCF category E LHDs is 8.98×10^{-9} fapfh.**
- **Decrease in the risk estimate is directly related to the decrease in the time spent at incorrect/unexpected flight levels**
- **Reduced numbers of operations associated with the COVID-19 pandemic during calendar year 2020 was also a factor in the number of reported occurrences in 2020.**



Vertical Collision Risk Estimates - Pacific Airspace

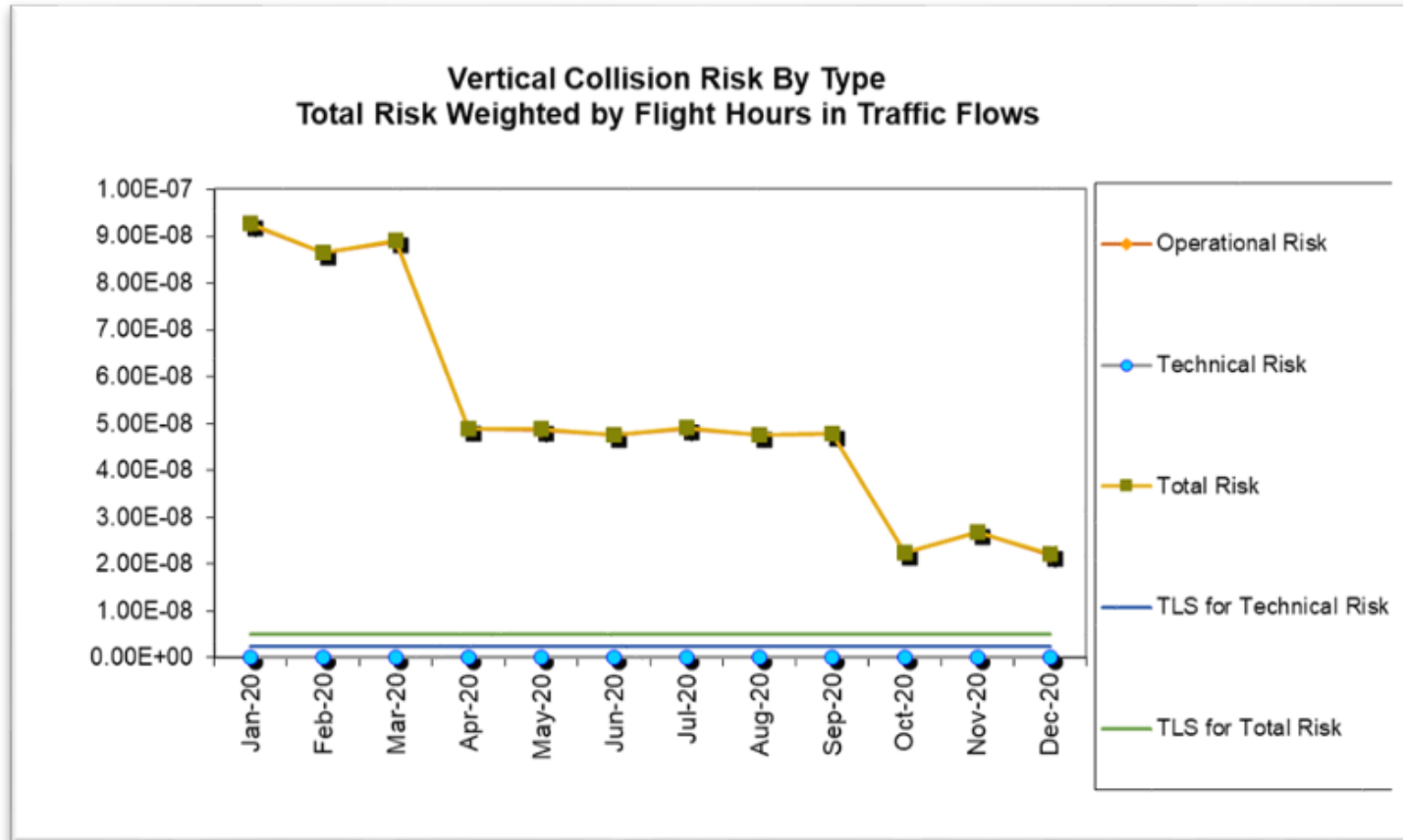
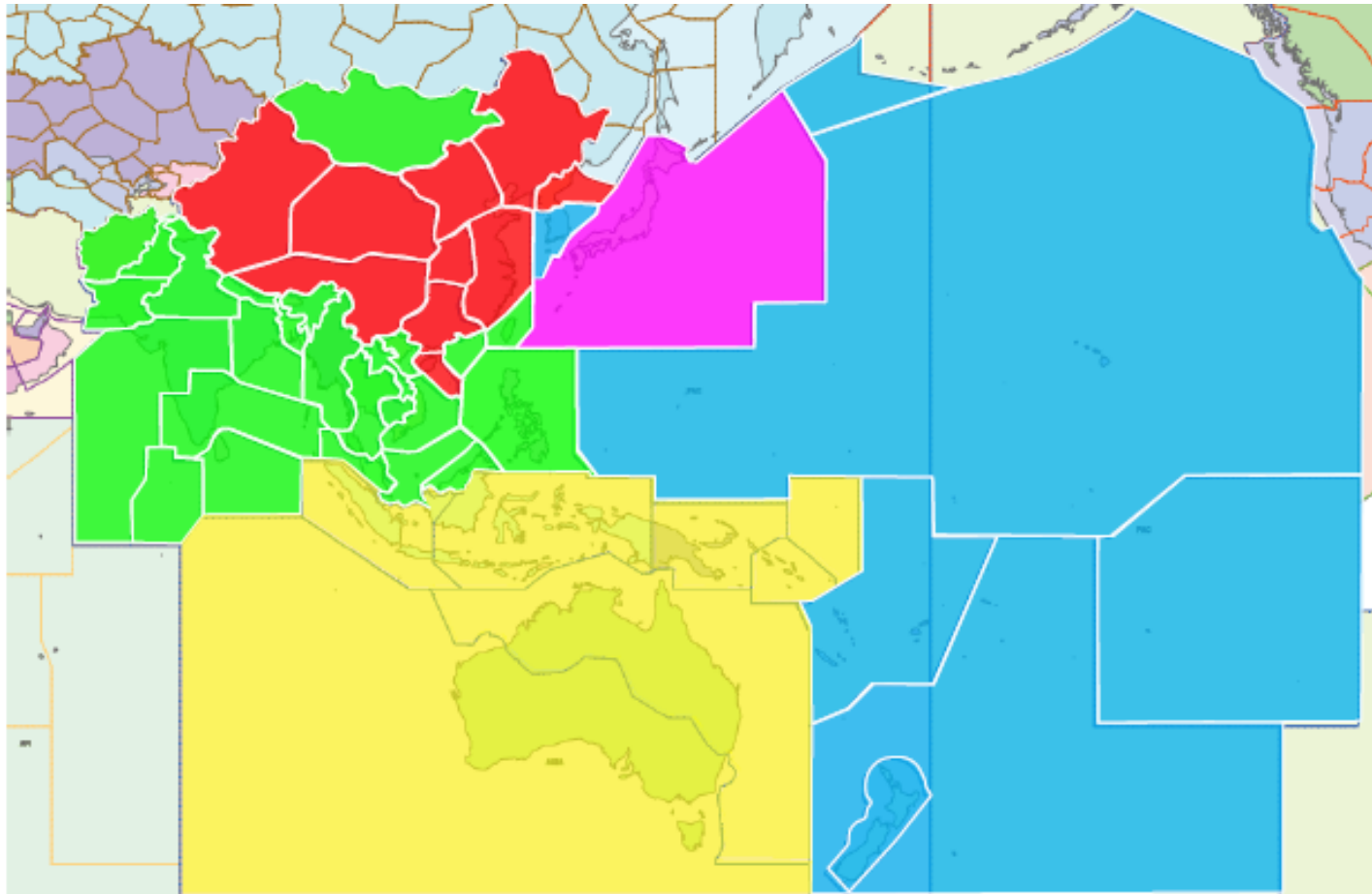


Figure 1 in WP12 (also Figure 8 in WP12 attachment)



Incheon FIR



Incheon FIR - Reported LHDs

Code	LHD Category Description	No.
A	Flight crew fails to climb or descend the aircraft as cleared	0
B	Flight crew climbing or descending without ATC clearance	0
C	Incorrect operation or interpretation of airborne equipment	0
D	ATC system loop error	0
E	Coordination errors in the ATC -to-ATC transfer of control responsibility as a result of human factors issues	2
F	ATC transfer of control coordination errors due to technical issues	0
G	Aircraft contingency leading to sudden inability to maintain level	0
H	Airborne equipment failure and unintentional or undetected level change	0
I	Turbulence or other weather related cause leading to unintentional or undetected change of flight level	0
J	TCAS resolution advisory; flight crew correctly climb or descend following the resolution advisory	0
K	TCAS resolution advisory; flight crew incorrectly climb or descend following the resolution advisory	0
L	An aircraft being provided with RVSM separation is not RVSM approved	0
M	Others	0
Total		2

Table 4 in WP12



Incheon FIR - Reported LHDs by Year

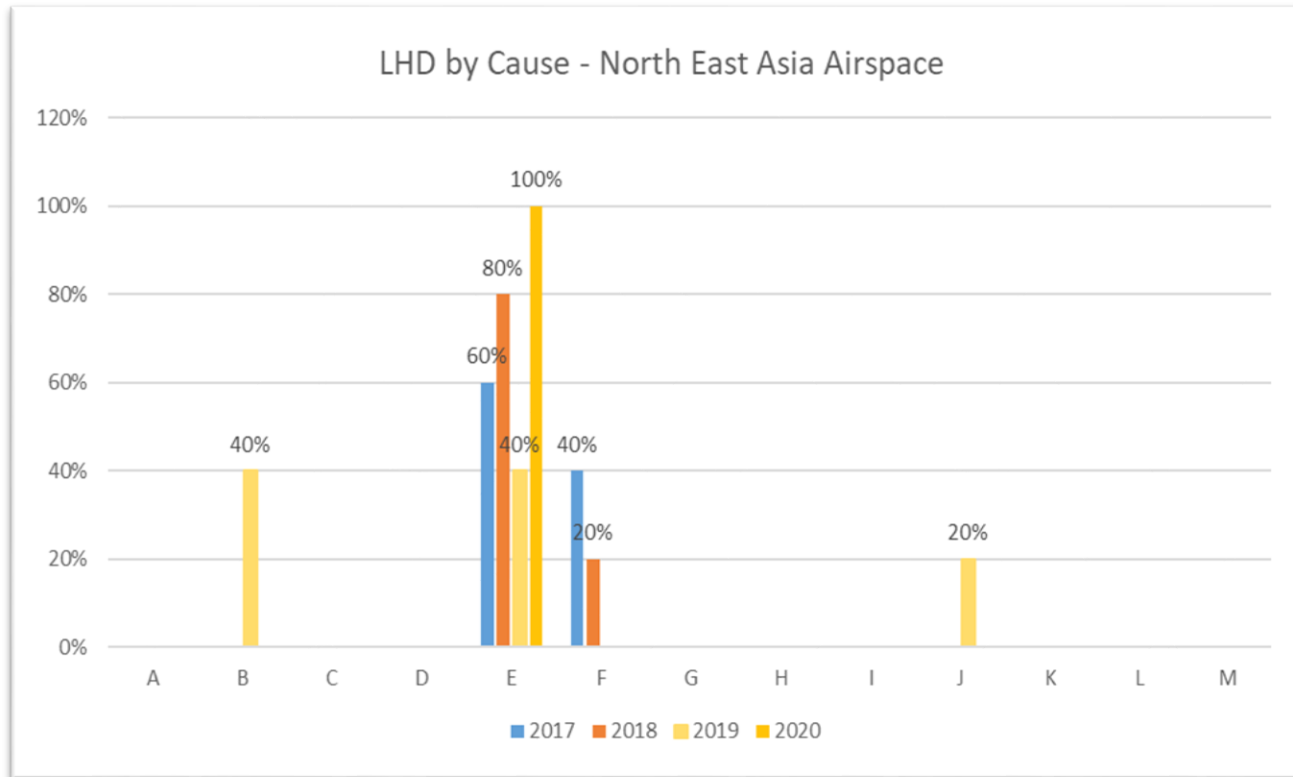


Figure 7 in WP12 attachment



Incheon FIR – Vertical Risk Estimate

North East Asia Airspace – estimated annual flying hours = 77,954 hours (note: estimated hours based on Dec 2020 traffic sample data)			
Source of Risk	Risk Estimation	TLS	Remarks
<i>RASMAG 25 Total Risk</i>	1.07×10^{-9}	5.0×10^{-9}	<i>Below TLS</i>
Technical Risk	0.23×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	0.00×10^{-9}	-	-
Total Risk	0.23×10^{-9}	5.0×10^{-9}	Below TLS

Table 3 in WP12

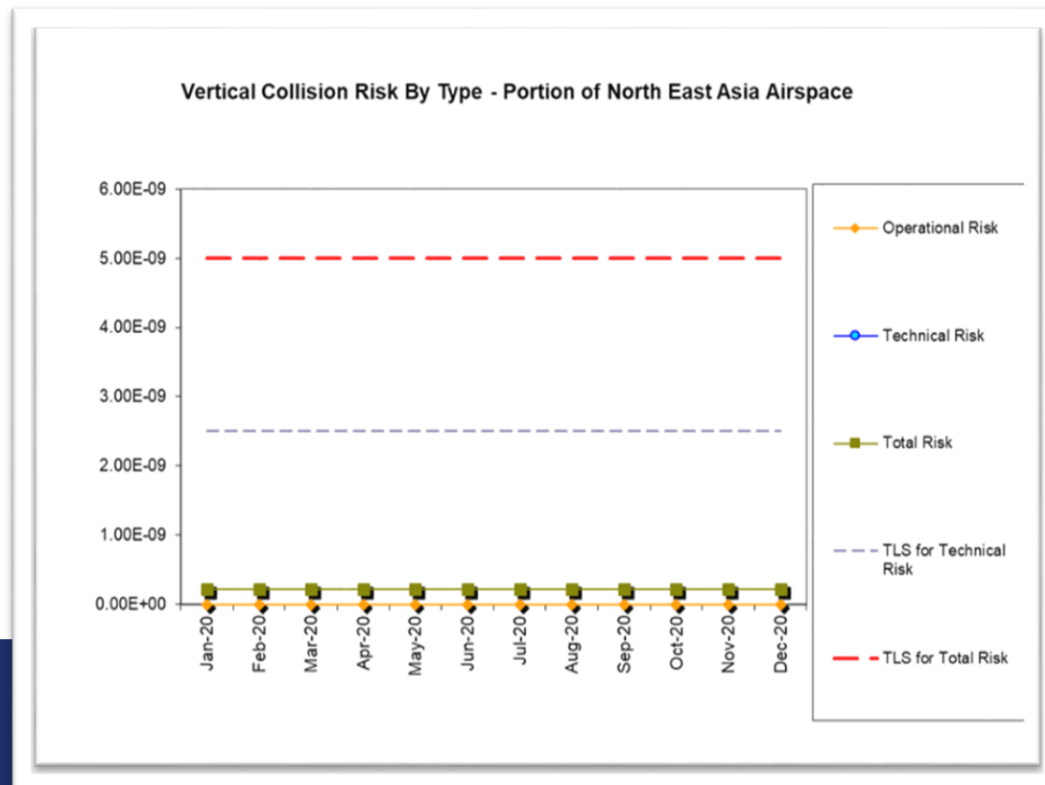


Figure 3 in WP12