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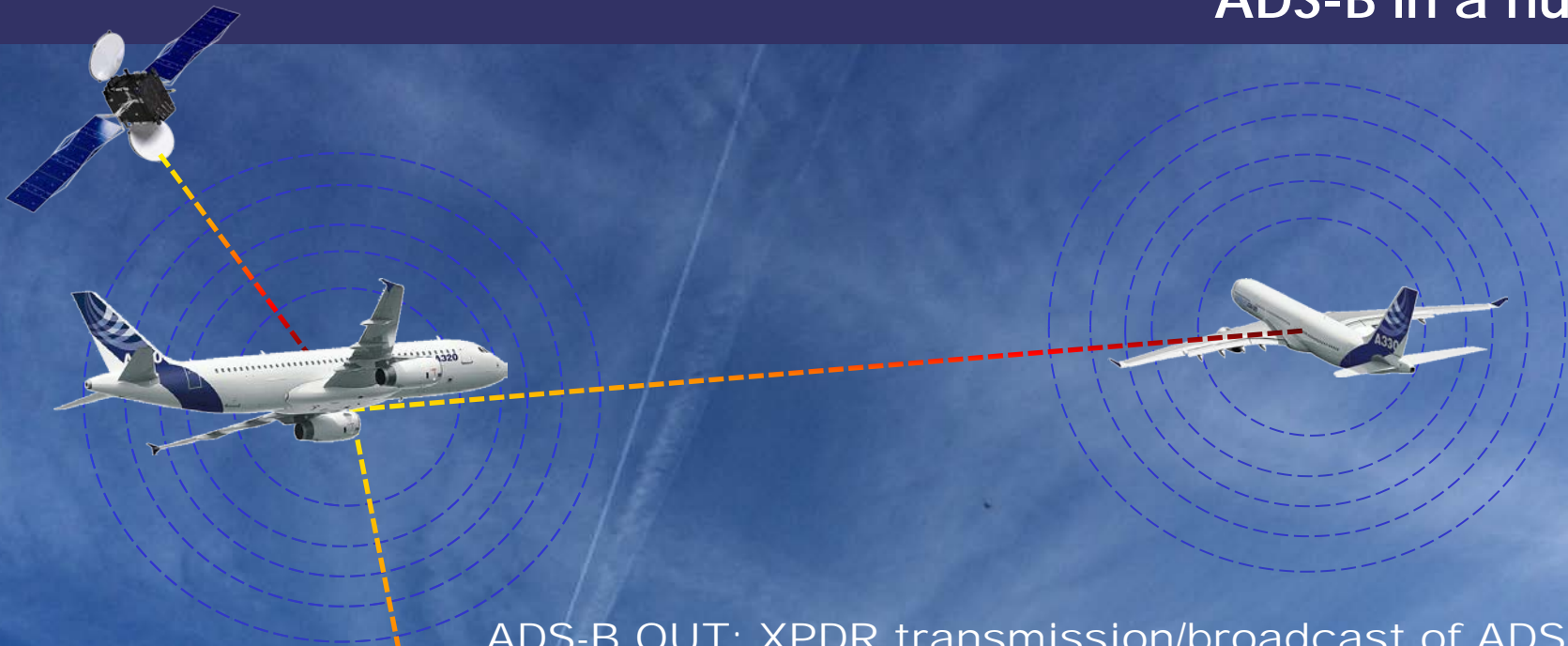


ADS-B & AVIONICS

ADS-B Task force seminar
Hong Kong, April 22nd 2014

ACSS
An L-3 Communications
& Thales Company

THALES

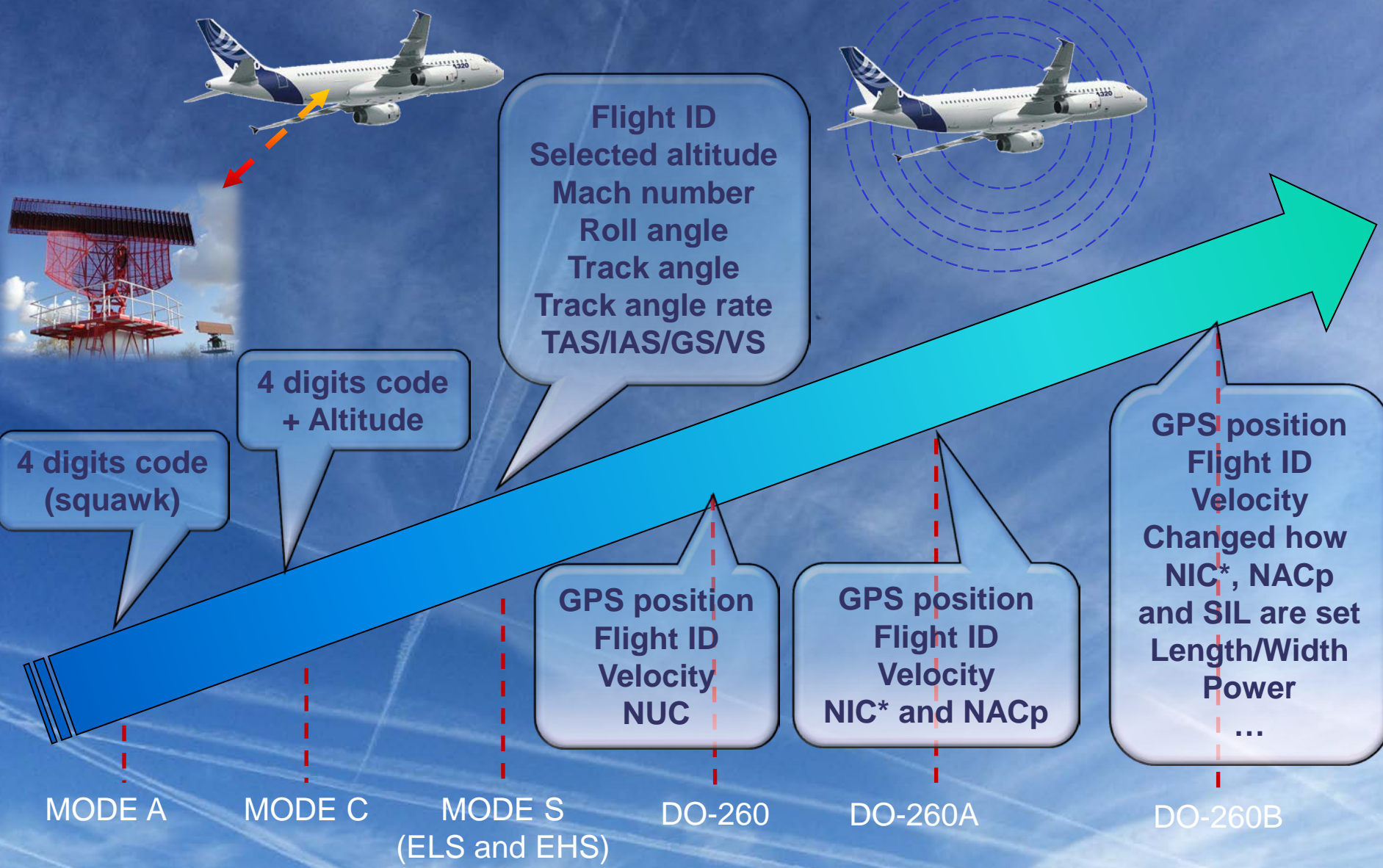


ADS-B OUT: XPDR transmission/broadcast of ADS-B messages

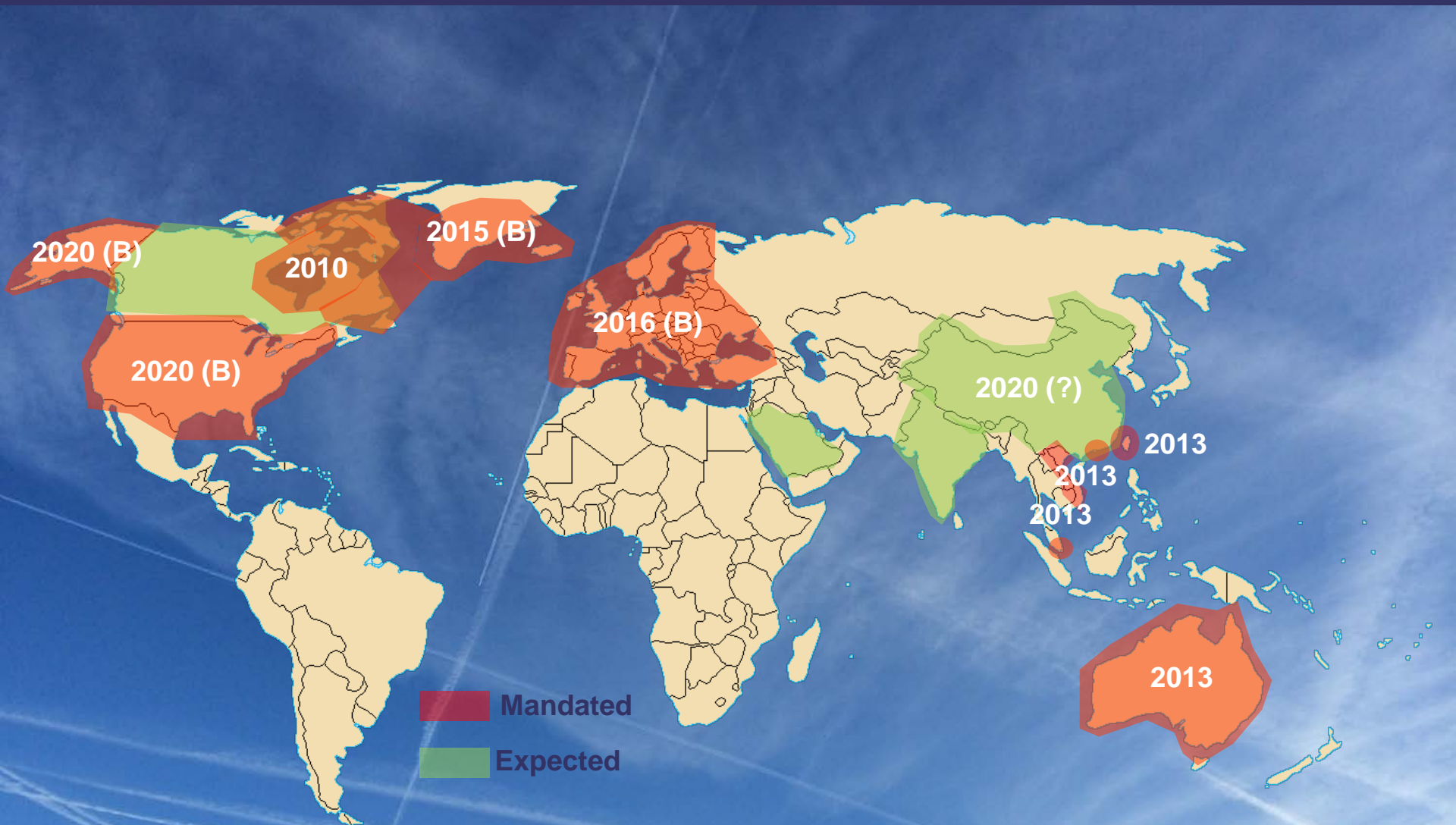
ADS-B IN: Aircraft TCAS reception of ADS-B messages

- ◆ Avionics receives aircraft ADS-B data
- ◆ Required for air to air applications

ADS-B
ground antenna



ADS-B OUT MANDATES WORLDWIDE





- ◆ **Changes in Calculation of Quality Values (NIC/SIL) give Greater Accuracy for ADS-B IN Functions**
- ◆ **Provisions for Future ADS-B IN Functions are Defined in DO-260B**
- ◆ **ADS-B Failure Annunciation**
- ◆ **Updates to On ground vs Airborne Source Selection Logic**
- ◆ **Updates for New/Changed Message Fields, Position Extrapolation Test Updated**
- ◆ **Program Pin Capability Added for DO-260B Configuration Parameters per ARINC 718A-4**



Europe

- ◆ **The European Rule asks for (E)TSO-129A as a minimum**
 - Thus SA=ON is acceptable
 - Though NPA 2012-19 published, it is silent on GNSS requirements
 - <http://www.easa.europa.eu/rulemaking/docs/npa/2012/2012-19/NPA%202012-19.pdf>

United States

- ◆ **A GPS receiver that is SA Aware will be necessary**

Australia

- ◆ **SA=ON is acceptable today**
- ◆ **SA Aware for Forward Fit begins in 2016**

Canada

- ◆ **SA=ON is acceptable**
 - No plans for SA Aware

<u>ADS-B System (Total)</u>	<u>Notes / Additional Information</u>
ADS-B Transmitter	Transponder Position/Velocity/Time Source
GPS Source (AC20-165):	(TSO-C129a, TSO C196, TSO-C145/146a)
Air/Ground Status	Discretes / Ground Speed input into Transponder
TCAS Status	Only required for aircraft with TCAS II Installed
ES Fail Warn	Control Panel
Pilot Input	Control Panel (Mode 3/A Code, IDENT, Flight ID, or Aircraft Registration) Heading Source Optional

Large portion of their aircraft are SA = On MMR/GNSS equipped

- ◆ **FAA requirement for SA Aware will require large retrofit programs in conjunction with Transponder Update**

There are many US aircraft to convert to DO 260B by mid 2019

- ◆ **Example: Delta has over 700, UAL, has over 700**
- ◆ **Other airlines and operators with fewer aircraft, have time But**

All the airlines must begin to modify their fleets starting in 2014

- ◆ **Which coincides with DO 260B transponders becoming available**

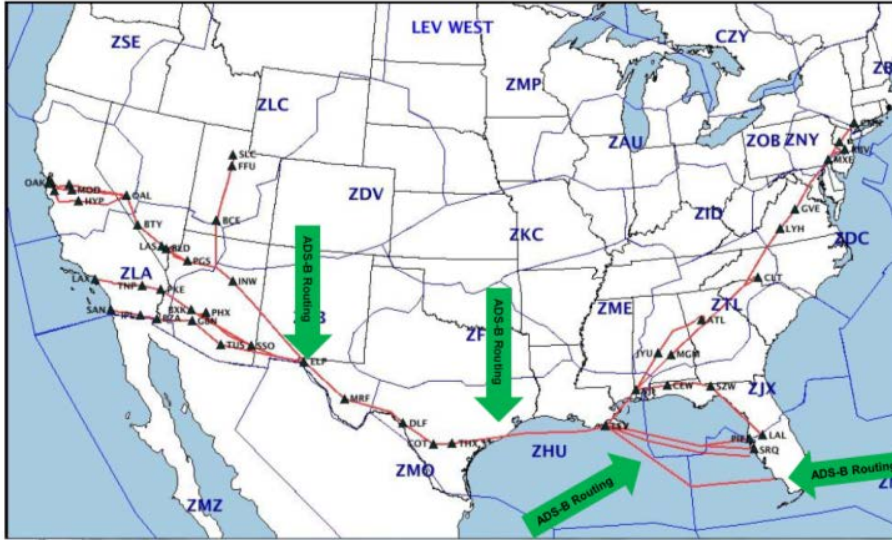
Transponder and SA Aware GNSS Equipment availability

- ◆ **May cause constraints in airlines and operators being able to meet the mandates**

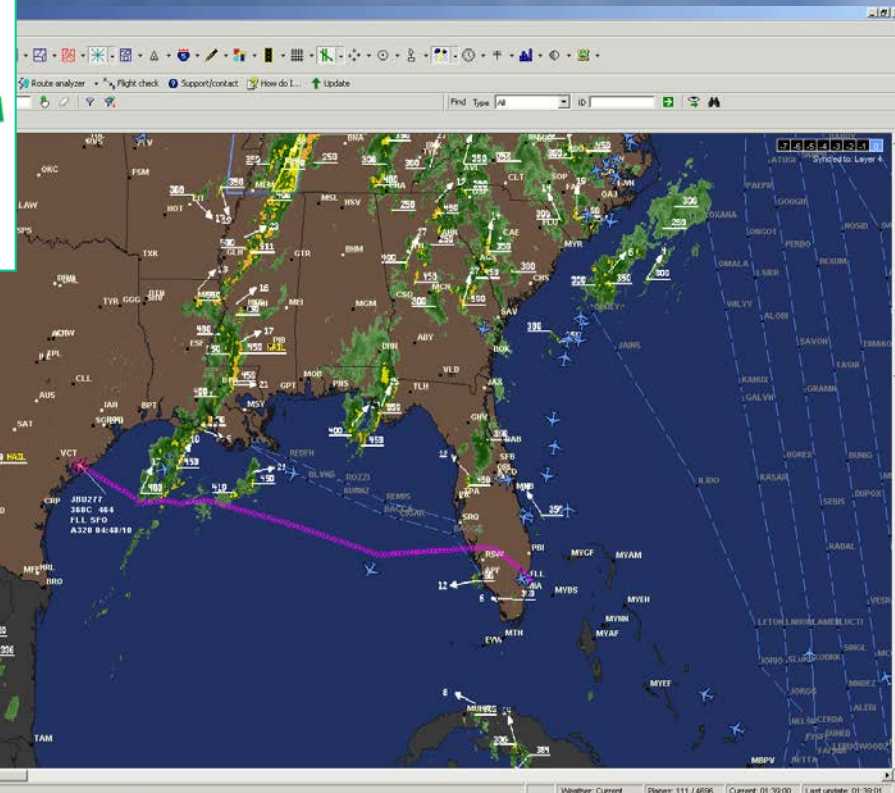
Europe is perhaps even more constrained due to 2017 Mandate

- ◆ **GNSS requirements difference will also create retrofit challenges**
 - Likely 20 to 30% of total fleets must meet the US Mandate for SA Aware

LEV WEST with ADS-B Gulf Routing Option



"ADS-B Gulf Routing Option": MARCI PLUMR EPSON MINOW LEV BOWFN HOODO PSX THX COT DLF KOBLE MRF ELP



#1094	ELP	22:10:00	04:50:10	
#1095	DLF	22:17:00	04:58:10	
#1096	COB	22:24:00	05:06:10	
#1097	EPN	22:31:00	05:14:10	
#1098	MIN	22:38:00	05:22:10	
#1099	LEW	22:45:00	05:30:10	
#1100	BOW	22:52:00	05:38:10	
#1101	HOO	22:59:00	05:46:10	
#1102	PSX	23:06:00	05:54:10	
#1103	THX	23:13:00	06:02:10	
#1104	COT	23:20:00	06:10:10	
#1105	DLF	23:27:00	06:18:10	
#1106	KOB	23:34:00	06:26:10	
#1107	MRF	23:41:00	06:34:10	
#1108	ELP	23:48:00	06:42:10	
#1109	EPN	23:55:00	06:50:10	
#1110	MIN	24:02:00	06:58:10	
#1111	LEW	24:09:00	07:06:10	
#1112	BOW	24:16:00	07:14:10	
#1113	HOO	24:23:00	07:22:10	
#1114	PSX	24:30:00	07:30:10	
#1115	THX	24:37:00	07:38:10	
#1116	COT	24:44:00	07:46:10	
#1117	DLF	24:51:00	07:54:10	
#1118	KOB	24:58:00	08:02:10	
#1119	MRF	25:05:00	08:10:10	
#1120	ELP	25:12:00	08:18:10	
#1121	EPN	25:19:00	08:26:10	
#1122	MIN	25:26:00	08:34:10	
#1123	LEW	25:33:00	08:42:10	
#1124	BOW	25:40:00	08:50:10	
#1125	HOO	25:47:00	08:58:10	
#1126	PSX	25:54:00	09:06:10	
#1127	THX	26:01:00	09:14:10	
#1128	COT	26:08:00	09:22:10	
#1129	DLF	26:15:00	09:30:10	
#1130	KOB	26:22:00	09:38:10	
#1131	MRF	26:29:00	09:46:10	
#1132	ELP	26:36:00	09:54:10	
#1133	EPN	26:43:00	10:02:10	
#1134	MIN	26:50:00	10:10:10	
#1135	LEW	26:57:00	10:18:10	
#1136	BOW	27:04:00	10:26:10	
#1137	HOO	27:11:00	10:34:10	
#1138	PSX	27:18:00	10:42:10	
#1139	THX	27:25:00	10:50:10	
#1140	COT	27:32:00	10:58:10	
#1141	DLF	27:39:00	11:06:10	
#1142	KOB	27:46:00	11:14:10	
#1143	MRF	27:53:00	11:22:10	
#1144	ELP	28:00:00	11:30:10	
#1145	EPN	28:07:00	11:38:10	
#1146	MIN	28:14:00	11:46:10	
#1147	LEW	28:21:00	11:54:10	
#1148	BOW	28:28:00	12:02:10	
#1149	HOO	28:35:00	12:10:10	
#1150	PSX	28:42:00	12:18:10	
#1151	THX	28:49:00	12:26:10	
#1152	COT	28:56:00	12:34:10	
#1153	DLF	29:03:00	12:42:10	
#1154	KOB	29:10:00	12:50:10	
#1155	MRF	29:17:00	12:58:10	
#1156	ELP	29:24:00	13:06:10	
#1157	EPN	29:31:00	13:14:10	
#1158	MIN	29:38:00	13:22:10	
#1159	LEW	29:45:00	13:30:10	
#1160	BOW	29:52:00	13:38:10	
#1161	HOO	29:59:00	13:46:10	
#1162	PSX	30:06:00	13:54:10	
#1163	THX	30:13:00	14:02:10	
#1164	COT	30:20:00	14:10:10	
#1165	DLF	30:27:00	14:18:10	
#1166	KOB	30:34:00	14:26:10	
#1167	MRF	30:41:00	14:34:10	
#1168	ELP	30:48:00	14:42:10	
#1169	EPN	30:55:00	14:50:10	
#1170	MIN	31:02:00	14:58:10	
#1171	LEW	31:09:00	15:06:10	
#1172	BOW	31:16:00	15:14:10	
#1173	HOO	31:23:00	15:22:10	
#1174	PSX	31:30:00	15:30:10	
#1175	THX	31:37:00	15:38:10	
#1176	COT	31:44:00	15:46:10	
#1177	DLF	31:51:00	15:54:10	
#1178	KOB	31:58:00	16:02:10	
#1179	MRF	32:05:00	16:10:10	
#1180	ELP	32:12:00	16:18:10	
#1181	EPN	32:19:00	16:26:10	
#1182	MIN	32:26:00	16:34:10	
#1183	LEW	32:33:00	16:42:10	
#1184	BOW	32:40:00	16:50:10	
#1185	HOO	32:47:00	16:58:10	
#1186	PSX	32:54:00	17:06:10	
#1187	THX	33:01:00	17:14:10	
#1188	COT	33:08:00	17:22:10	
#1189	DLF	33:15:00	17:30:10	
#1190	KOB	33:22:00	17:38:10	
#1191	MRF	33:29:00	17:46:10	
#1192	ELP	33:36:00	17:54:10	
#1193	EPN	33:43:00	18:02:10	
#1194	MIN	33:50:00	18:10:10	
#1195	LEW	33:57:00	18:18:10	
#1196	BOW	34:04:00	18:26:10	
#1197	HOO	34:11:00	18:34:10	
#1198	PSX	34:18:00	18:42:10	
#1199	THX	34:25:00	18:50:10	
#1200	COT	34:32:00	18:58:10	

TRANSPONDERS

XS950



Available on Airbus
and Boeing
Fully DO260B/DO181E

NXT800



Available on
Boeing a/c
Fully DO260B/DO181E

NXT600



Available on
ATR & Q400 a/c
Fully DO260B/DO181E

TCAS (ADS-B IN Capable)

T³CAS std 2



Integrated Surveillance
solution on Airbus a/c.
TCAS/TAWS/Transponder
Fully DO260B/DO181E

TCAS 3000SP



Surveillance solution
On Boeing a/c

- ◆ Access real time air control data from your cockpit
- ◆ Traffic detection range up to 150 Nm
- ◆ Enhanced situational awareness
- ◆ Reduced flight crew workload and radio traffic with the controller.

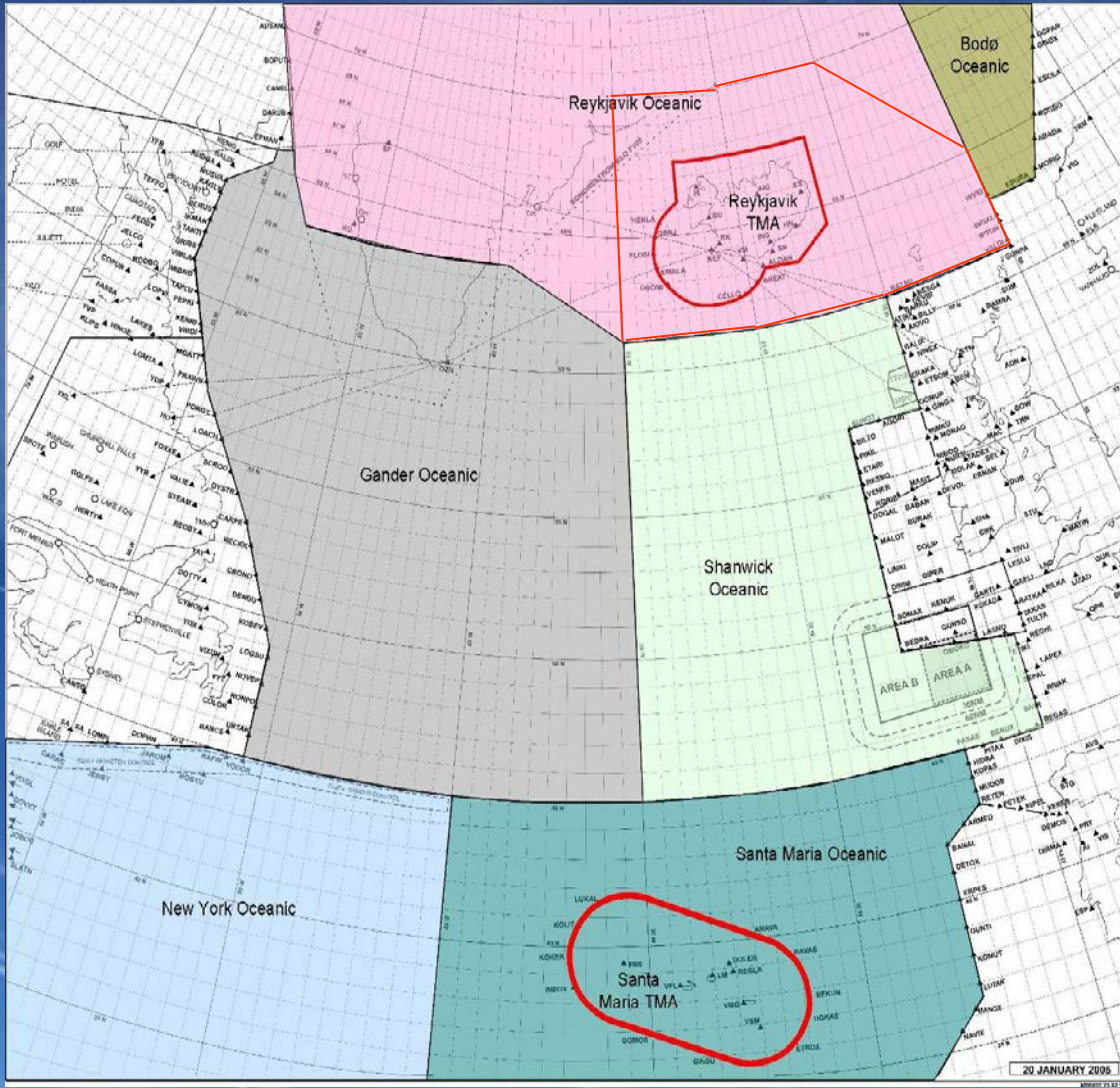




Other	Proximate	TA	RA
+10 ◇ ↑	+10 ◇ ↑	● ↑ -08	■ ↑ -05
+10 ↑ ✈	+10 ↑ ✈	✈ -08 ↑	✈ -05 ↑
+10 ↑ ✈	+10 ↑ ✈	● ✈ -08 ↑	■ ✈ -05 ↑

Source Airbus

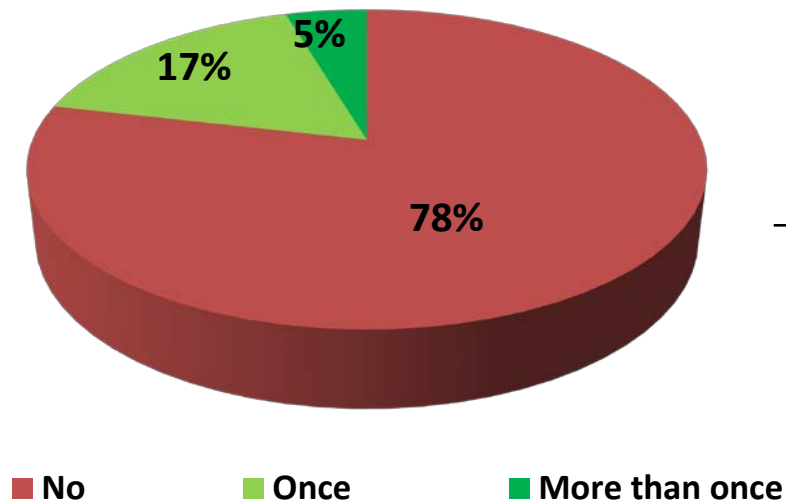
CRISTAL ITP TRIAL AREA



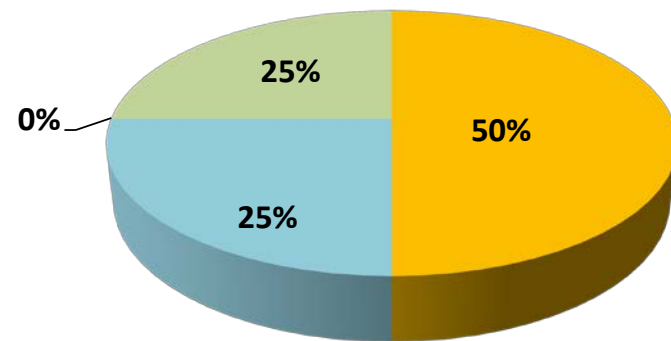
Source Eurocontrol 2013

ITP Benefits

1a) Did you consider asking for an ITP clearance (but no request made)?

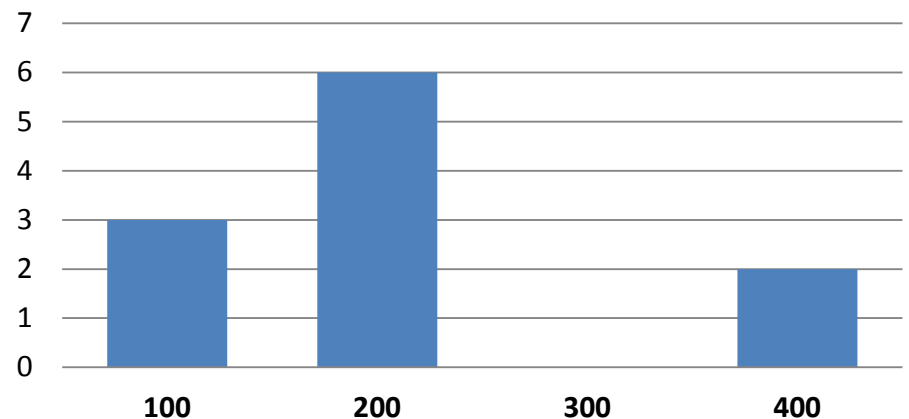


Please explain why?



■ Fuel-efficient FL
 ■ Optimum wind FL
 ■ Turbulence
 ■ Training

FMS calculated fuel saving from potential ITP level change (kg)



Flight Deck Interval Management...

Source Airbus



Source Airbus



Addressing runway incursions...





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THANK YOU

ADS-B Task force seminar
Hong Kong, April 22nd 2014

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