

Developing a Roadmap to Success

What's Needed to Support UPRs

Presented to: The 9th Pacific Project Team Meeting

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**Federal Aviation
Administration**

Introduction

- **Review of Terms of Reference (TORs) for Pacific Project (PPT) and relevant discussions to airspace analysis**
- **Discuss necessary requirements/inhibitors to support UPRs and results from seamless airspace chart**
- **Evaluate operator desired UPR improvements in respective airspace volumes compared to ANSP requirements**



TOR and PPT Discussion Highlights

- **Objectives in TORs**

- improve operational efficiency with UPRs as primary navigation means
- development of “seamless and homogenous airspace for air traffic between North America and Asia...”

- **TOR Work Program includes**

- analysis of current flows,
- review of existing CNS/ATM plans/capabilities
- gap analysis



TOR and PPT Discussion Highlights

- **Based on size of Pacific Project airspace, suggested division of airspace into four geographical regions**
 - Arctic
 - Anchorage/Russian Trans East (RTE)
 - NOPAC
 - PACOTS/CENPAC



TOR and PPT Discussion Highlights

- **For discussions on gap analysis and possible UPR expansion, recommendation to exclude discussions on PACOTS/CENPAC**
 - Avoids duplication of efforts from ongoing work at IPACG
- **A seamless airspace chart was developed and distributed to PPT ANSPs to assess current and future planned capabilities**
 - Responses received from 5 of 8 ANSPs



TOR and PPT Discussion Highlights

- **The seamless airspace chart covers three basic categories-**
 - Surveillance
 - Procedures
 - Communication
- **The PPT was asked to assess current/future capabilities in conjunction with operator perceived shortfalls/lack of efficiency, determine desired end-state, develop realistic short, mid, and long term goals with success criteria.**



What is needed to support/expand UPRs?

- **FAA asked for input from all three of its Oceanic Facilities and the PPT ANSPs**
- **Three general areas at core of managing UPRs**
 - Technology
 - Ground automation, surveillance, comms., aircraft equipage
 - Rules
 - Legislative, restrictions that avoid SUAs or cause automation problems, safety analysis
 - Predictability
 - Traffic density, complexity, other traffic management considerations



What is needed to support/expand UPRs- Technology

- **Various Technologies to Consider**
 - Ground automation that tracks aircraft and detects conflicts
 - Can be done manually but is time/labor-intensive
 - Requires controller to manually plot crossing points, some of which may not be associated with fix and calculate separation
 - Surveillance
 - Radar, ADS-C, ADS-B
 - Communication
 - VHF, HF, CPDLC, AIDC
 - Also applies to reliability
 - » In northern latitudes may not be reliable or usable
 - Aircraft Equipage
 - Application of reduced separation, ADS-C/CPDLC



What is needed to support/expand UPRs- Technology

- **Arctic Surveillance**

ANSP	Radar	ADS-C	ADS-B	Other
Anchorage Arctic	No	September 2015	No	N/A
Edmonton	Partial	Fall 2015	Yes	Space-based ADS-B 2018
Magadan	Unknown	Unknown	Unknown	Unknown
Murmansk	Unknown	Unknown	Unknown	Unknown



What is needed to support/expand UPRs- Technology

- **Anchorage/RTE Surveillance**

ANSP	Radar	ADS-C	ADS-B	Other
Anchorage	Yes	No	Yes	N/A
Edmonton	Partial	Fall 2015	Yes	Space-based ADS-B 2018
Magadan	Unknown	Unknown	Unknown	Unknown
P-K	Unknown	Unknown	Unknown	Unknown

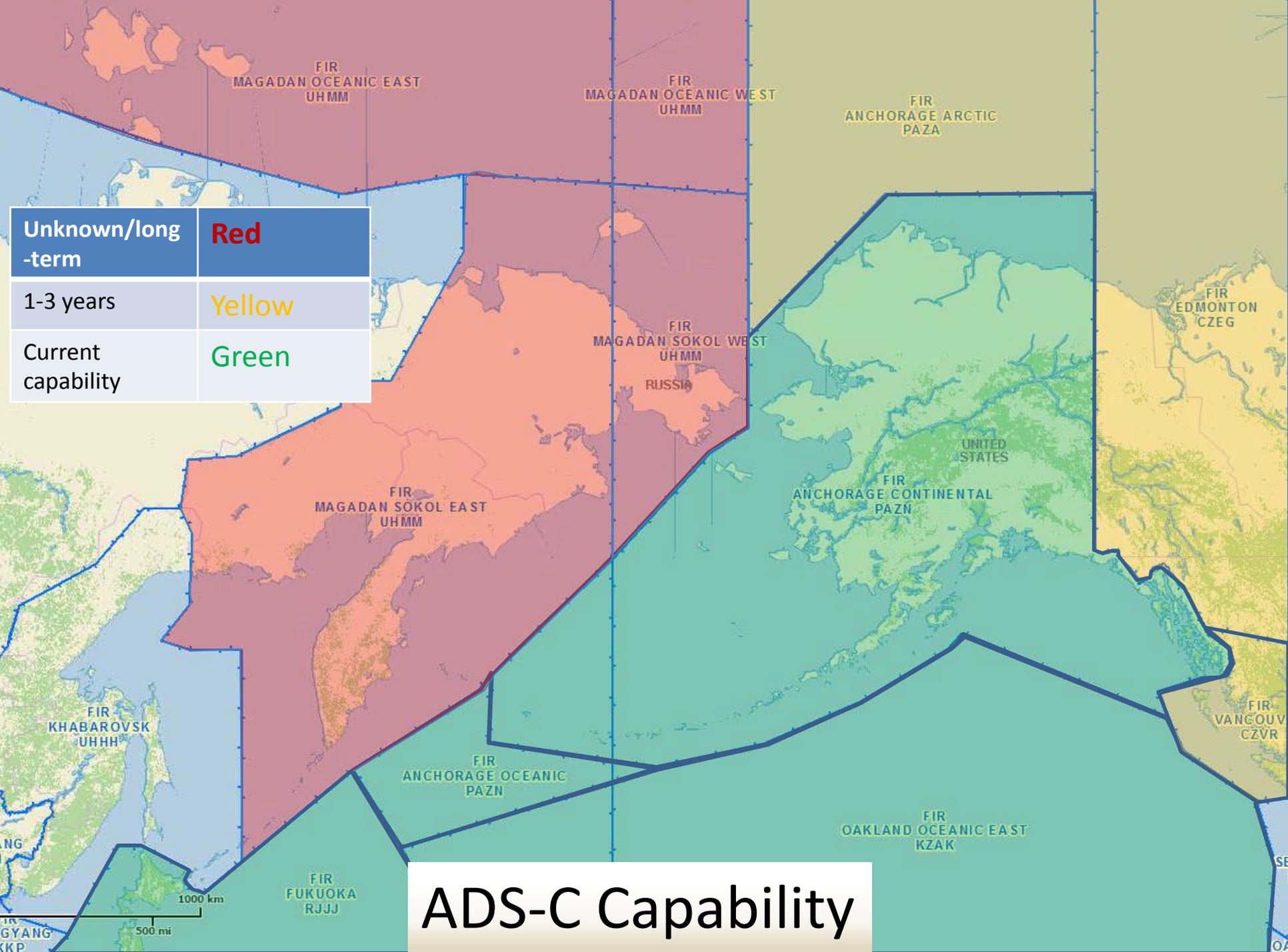


What is needed to support/expand UPRs- Technology

- **NOPAC Surveillance**

ANSP	Radar	ADS-C	ADS-B	Other
Anchorage	Partial	Yes	Partial	N/A
Fukuoka	Yes	Yes	No	N/A
Oakland	Partial	Yes	No	N/A
P-K	Unknown	Unknown	Unknown	Unknown
Vancouver	Yes	Late 2015	Unknown	Space-based ADS-B 2018?





Unknown/long-term	Red
1-3 years	Yellow
Current capability	Green

ADS-C Capability

What is needed to support/expand UPRs- Technology

- **Communications- Arctic**

ANSP	CPDLC	AIDC
Anchorage Arctic	Yes	Yes
Edmonton	Yes	Yes
Magadan	Yes	Unknown
Murmansk	Unknown	Unknown



What is needed to support/expand UPRs- Technology

- **Communications- Anchorage/RTE**

ANSP	CPDLC	AIDC
Anchorage	Yes	Yes
Edmonton	Yes	Yes
Magadan	Yes	Yes
P-K	Unknown	Unknown

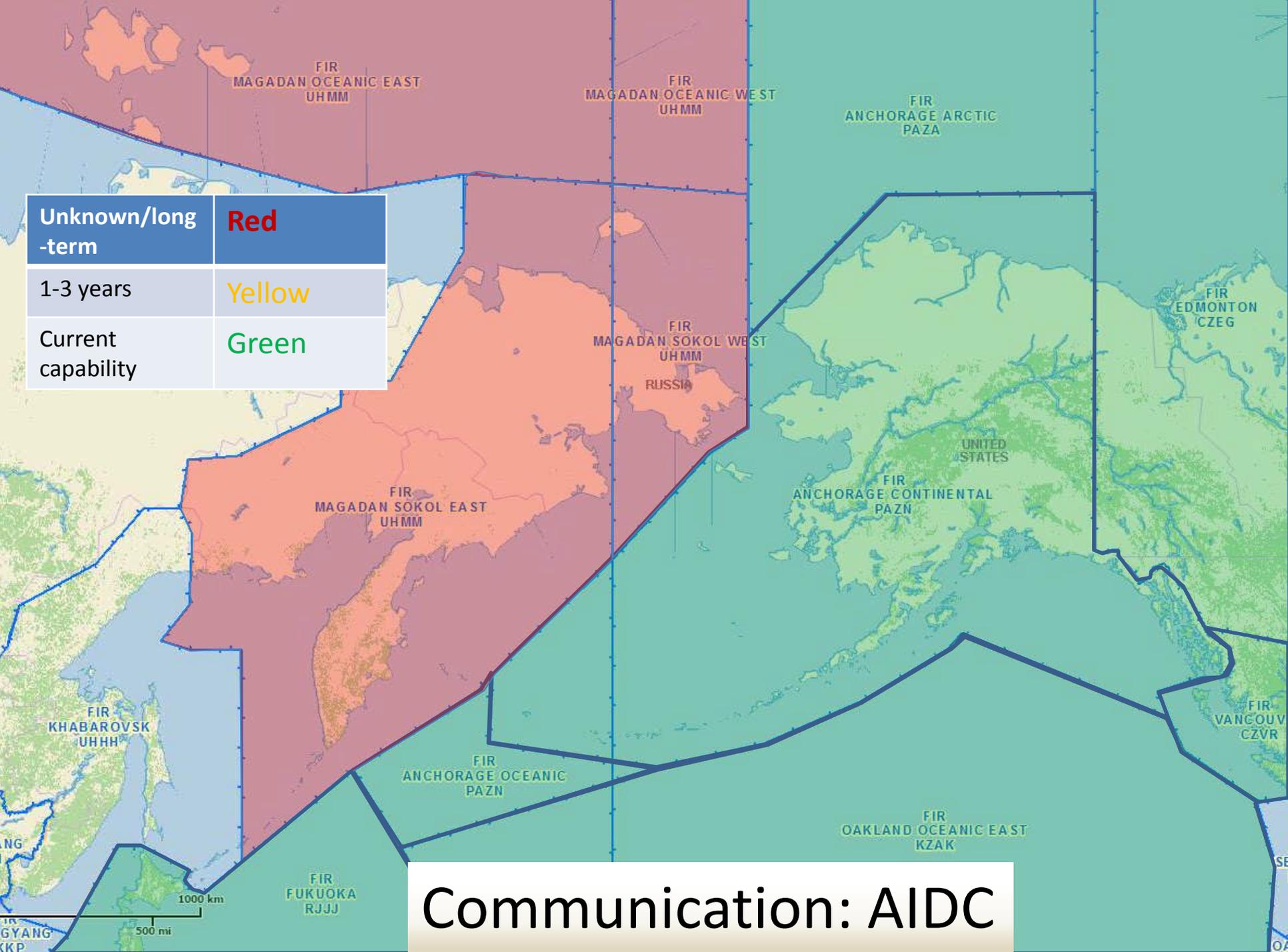


What is needed to support/expand UPRs- Technology

- **Communications- NOPAC**

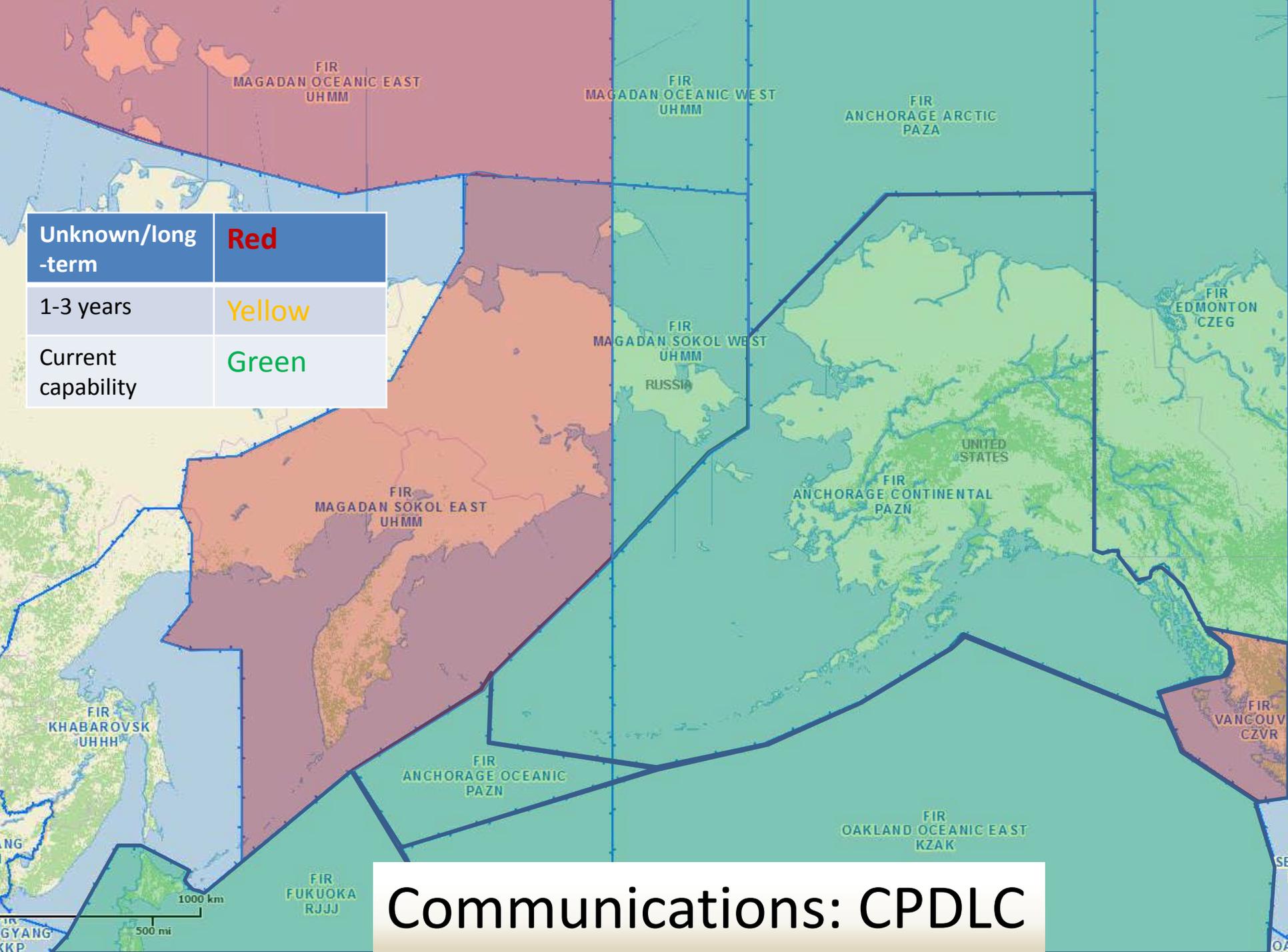
ANSP	CPDLC	AIDC
Anchorage	Yes	Yes
Fukuoka	Yes	Yes
Oakland	Yes	Yes
P-K	Unknown	Unknown
Vancouver	Unknown	Yes





Unknown/long-term	Red
1-3 years	Yellow
Current capability	Green

Communication: AIDC



Unknown/long-term	Red
1-3 years	Yellow
Current capability	Green

Communications: CPDLC

What is needed to support/expand UPRs- Technology

- **Reduced Separation- Arctic**

ANSP	50 NM Lateral	50 NM Longitudinal	30 NM Lateral	30 NM Longitudinal
Anchorage Arctic	Yes	TBA	TBA	TBA
Edmonton	RNP-4 or 10 aircraft only	Unknown	TBA	TBA
Magadan	Unknown	Unknown	Unknown	Unknown
Murmansk	Unknown	Unknown	Unknown	Unknown



What is needed to support/expand UPRs -Technology

- **Reduced Separation- Anchorage/RTE**

ANSP	50 NM Lateral	50 NM Longitudinal	30 NM Lateral	30 NM Longitudinal
Anchorage	Yes	Yes	Yes	Yes
Edmonton	RNP-4 or 10 aircraft only	Unknown	TBA	TBA
Magadan	Unknown	Unknown	Unknown	Unknown
P-K	Unknown	Unknown	Unknown	Unknown

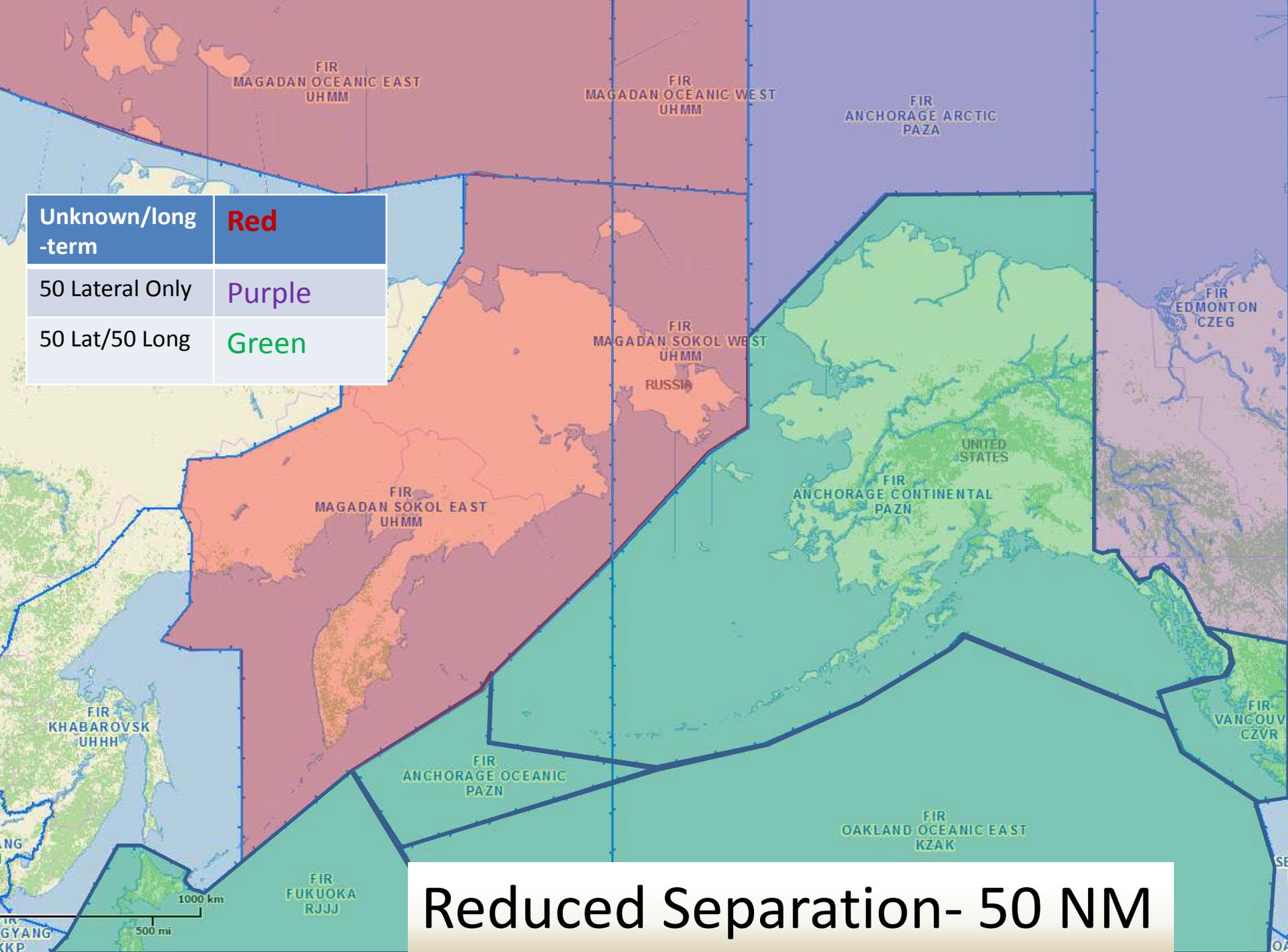


What is needed to support/expand UPRs- Technology

- **Reduced Separation- NOPAC**

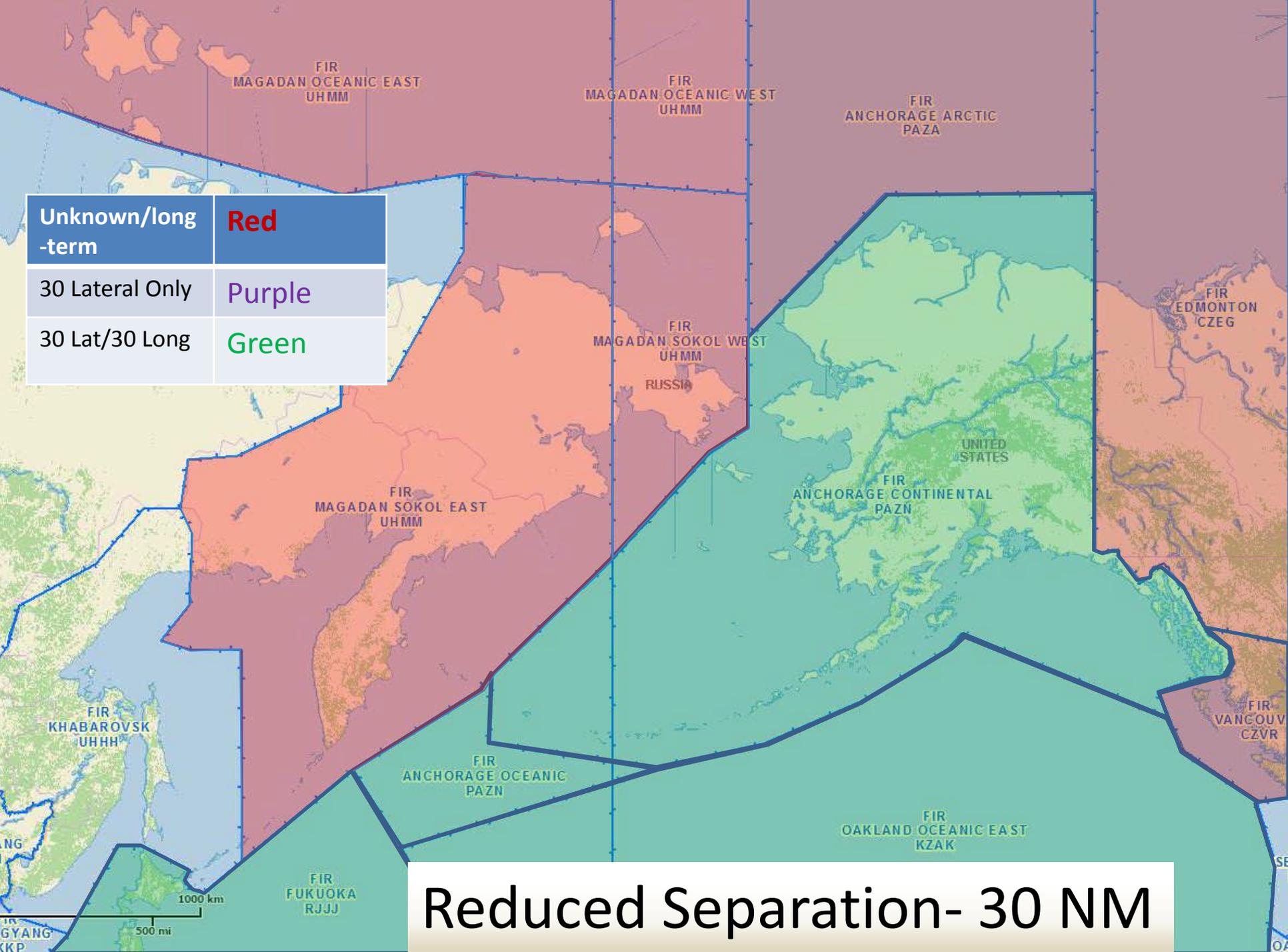
ANSP	50 NM Lateral	50 NM Longitudinal	30 NM Lateral	30 NM Longitudinal
Anchorage	Yes	Yes	Yes	Yes
Fukuoka	Yes	Yes	Yes	Yes
Oakland	Unknown	Unknown	Unknown	Unknown
P-K	Unknown	Unknown	Unknown	Unknown
Vancouver	Yes	Yes	Unknown	Unknown





Unknown/long-term	Red
50 Lateral Only	Purple
50 Lat/50 Long	Green

Reduced Separation- 50 NM



Unknown/long-term	Red
30 Lateral Only	Purple
30 Lat/30 Long	Green

Reduced Separation- 30 NM

What is needed to support/expand UPRs- Rules

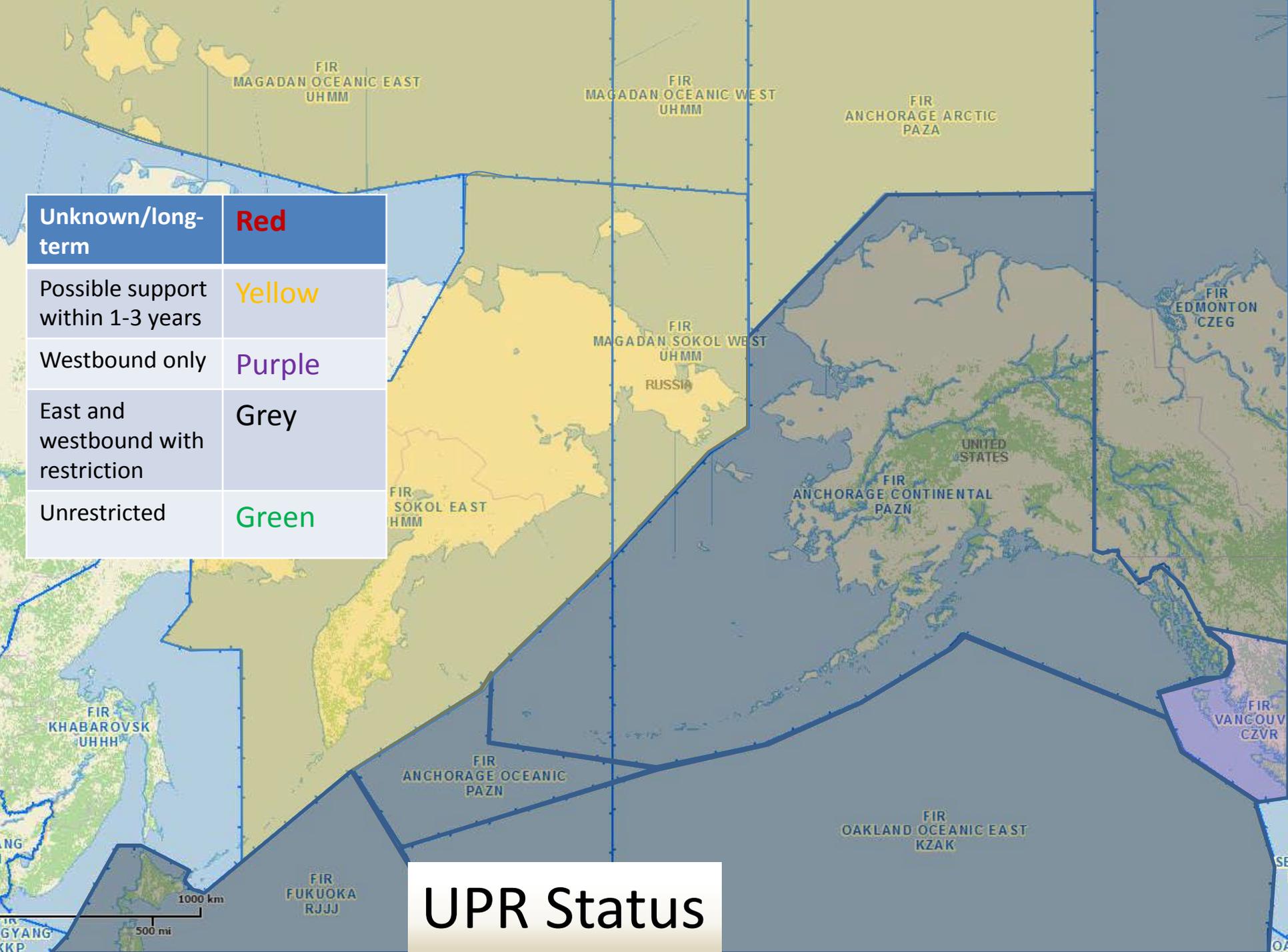
- **Rules is a somewhat generic term but really covers two basic areas in reference to UPRs**
 - Legislative
 - Does regulator allow or are there provisions within procedures documents to allow?
 - Restrictions
 - Avoidance of SUA
 - Prevent automation or coordination issues
 - Those needed to enhance/maintain safety
 - Traffic management



What is needed to support/expand UPRs- Predictability

- **Put simply, knowing where aircraft are going to be**
 - Traffic density
 - More aircraft in one place mean fewer at optimal altitude
 - Does benefit of UPR outweigh that of flex or fixed route?
 - Sector complexity
 - Unidirectional, bidirectional, and/or crossing traffic can affect. Traffic density also impacts.
 - Traffic management
 - Reroute off of UPR for traffic
 - More likely today or in UPR environment?





Unknown/long-term	Red
Possible support within 1-3 years	Yellow
Westbound only	Purple
East and westbound with restriction	Grey
Unrestricted	Green

UPR Status

1000 km

500 mi

Operator-Perceived Shortfalls or Lack of Efficiency

- **Based on current status of UPRs and consideration of what items are needed to support-**
 - What do operators see as priority areas?
 - Using seamless airspace chart and other considerations, what are short, mid, and long-term goals?
 - What are success criteria for each goal?
 - What is the desired end state?



Questions?

