Ground Based LISP - A Mobility and Multilink Solution for Safety Critical Communication in Aviation

draft-haindl-lisp-gb-atn

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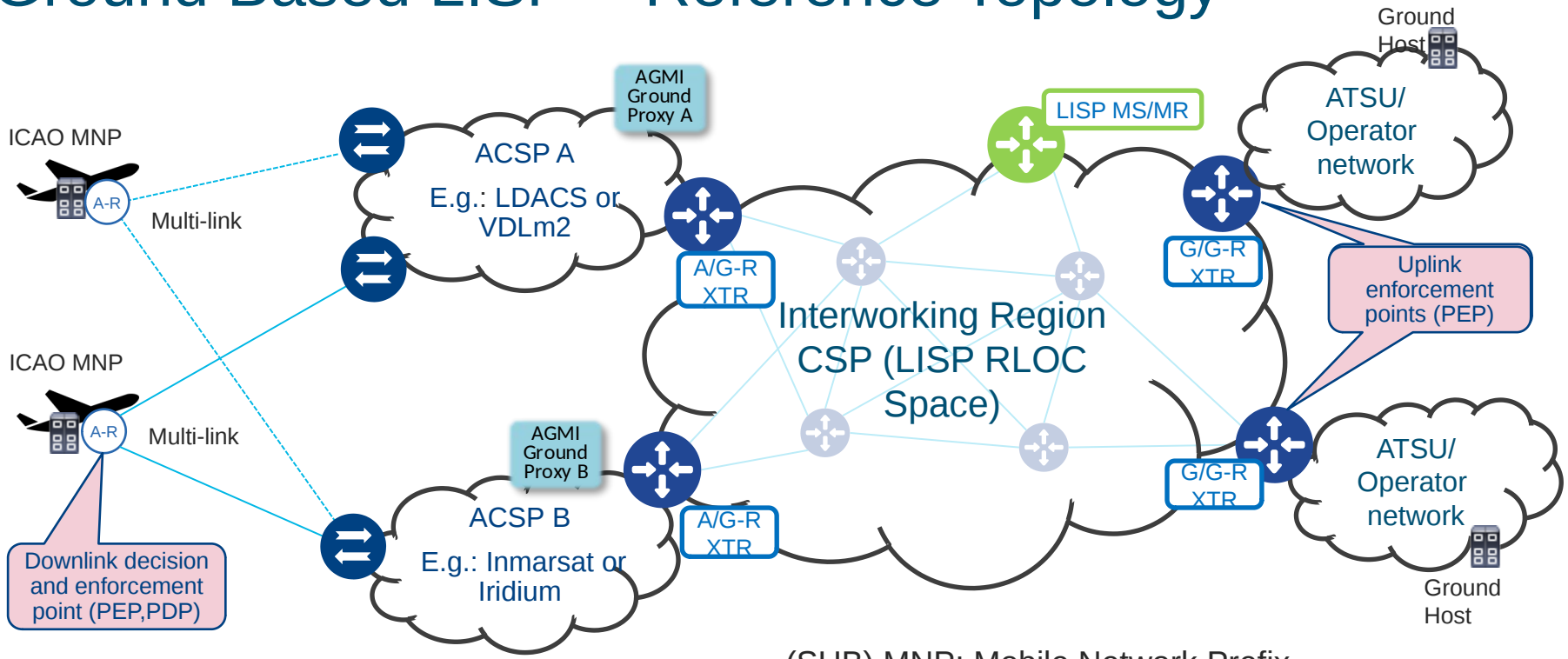
Agenda

- Ground Based LISP Scope and Concept
- Multilink usage and local policy override
- Standardization in IETF

GB-LISP scope

- Ground Based LISP implementing a Mobility and Multilink Solution for Safety Critical Communication in Aviation standardized in ICAO.
- The mobility and multilink system enables the aircraft and ground hosts to use multiple Air-Ground Access Networks during all phases of flight. It distributes the required information to the mobility and multilink decision elements on ground an in the airborne IPS system.
- The AGMI protocol is used between the airborne IPS system and the AGMI ground proxy to exchange mobility and multilink information, including A/G link status and preferences. This domain specific protocol will be specified in ICAO DOC9896.
- The LISP control plane distributes this mobility and multilink-related information from the AGMI proxies in the A/G access networks to the G/G Border Routers (LISP XTR) in the different networks. The G/G-R are the multilink policy enforcement point for the uplink traffic.

Ground Based LISP - Reference Topology

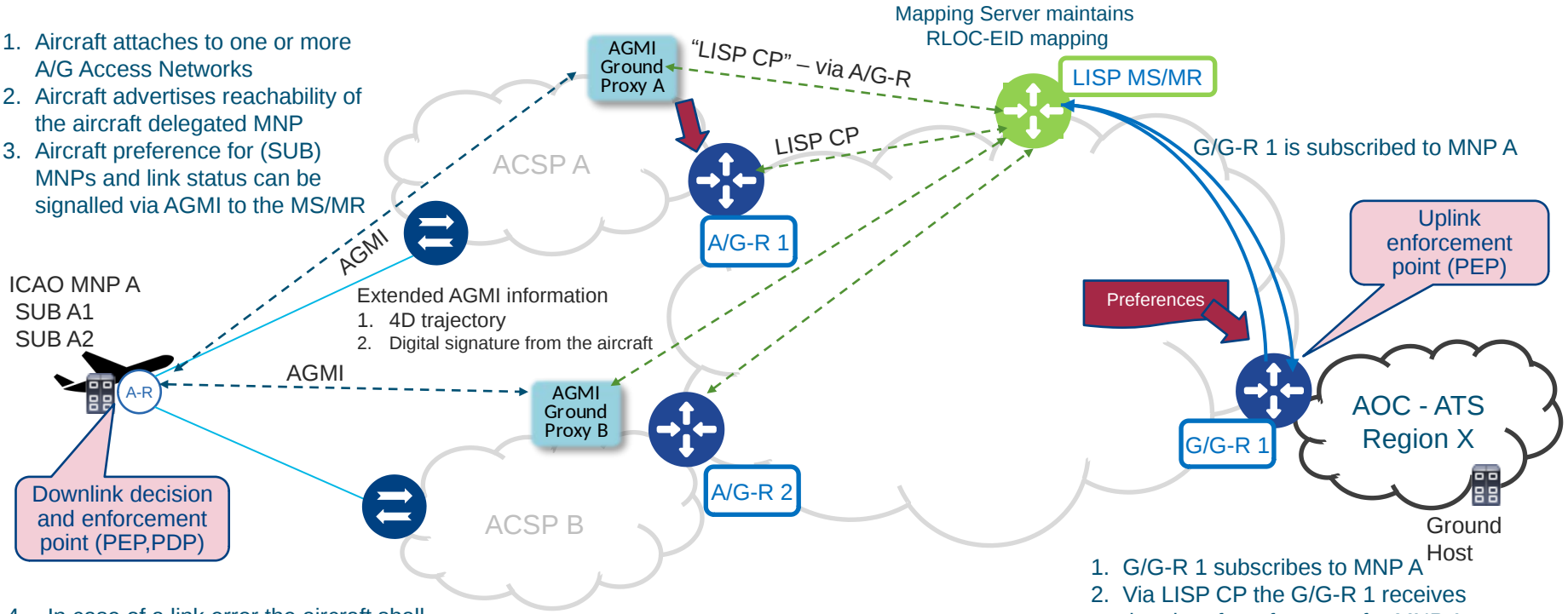


PEP: Multilink Policy Enforcement Point
PDP: Multilink Policy Decision Point
A-R: Airborne Router

(SUB) MNP: Mobile Network Prefix
A/G-R: Air/Ground Border Router (LISP XTR)
G/G-R: Ground/Ground Border Router (LISP XTR)
ACSP: A/G Access Service Provider

Ground Based LISP (GBL) - Concept

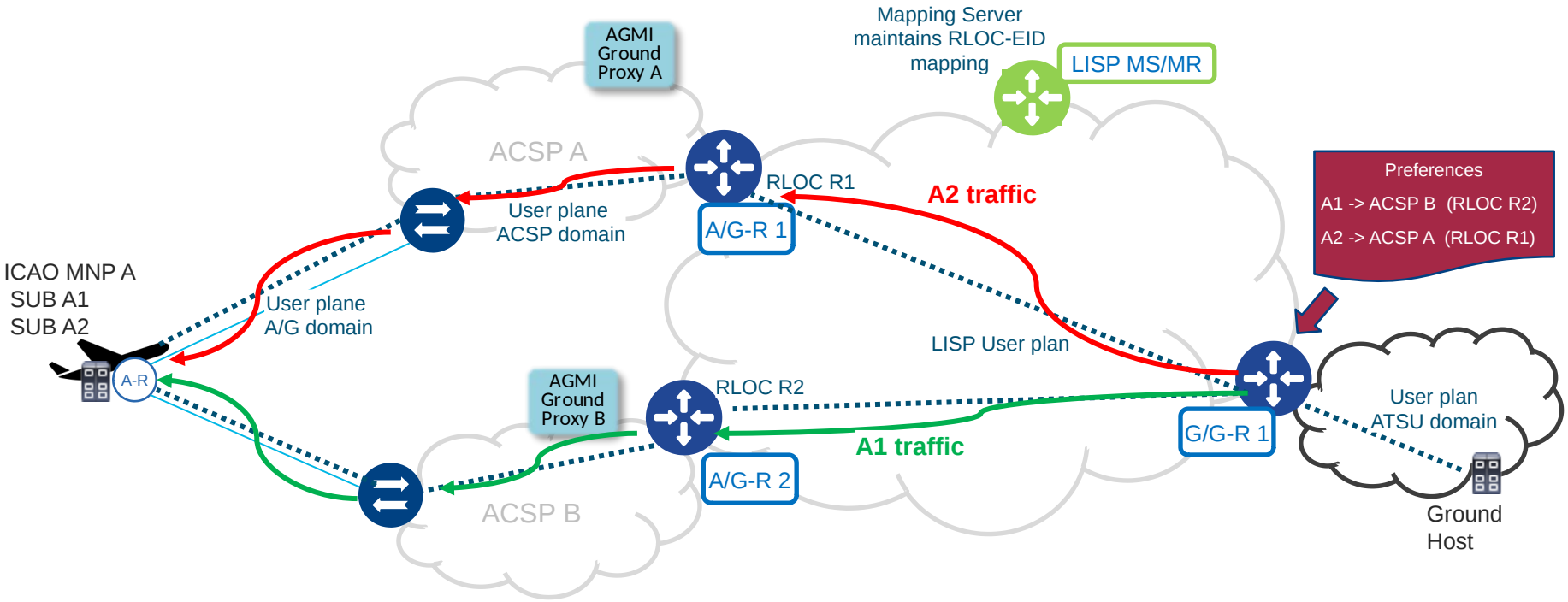
1. Aircraft attaches to one or more A/G Access Networks
2. Aircraft advertises reachability of the aircraft delegated MNP
3. Aircraft preference for (SUB) MNPs and link status can be signalled via AGMI to the MS/MR



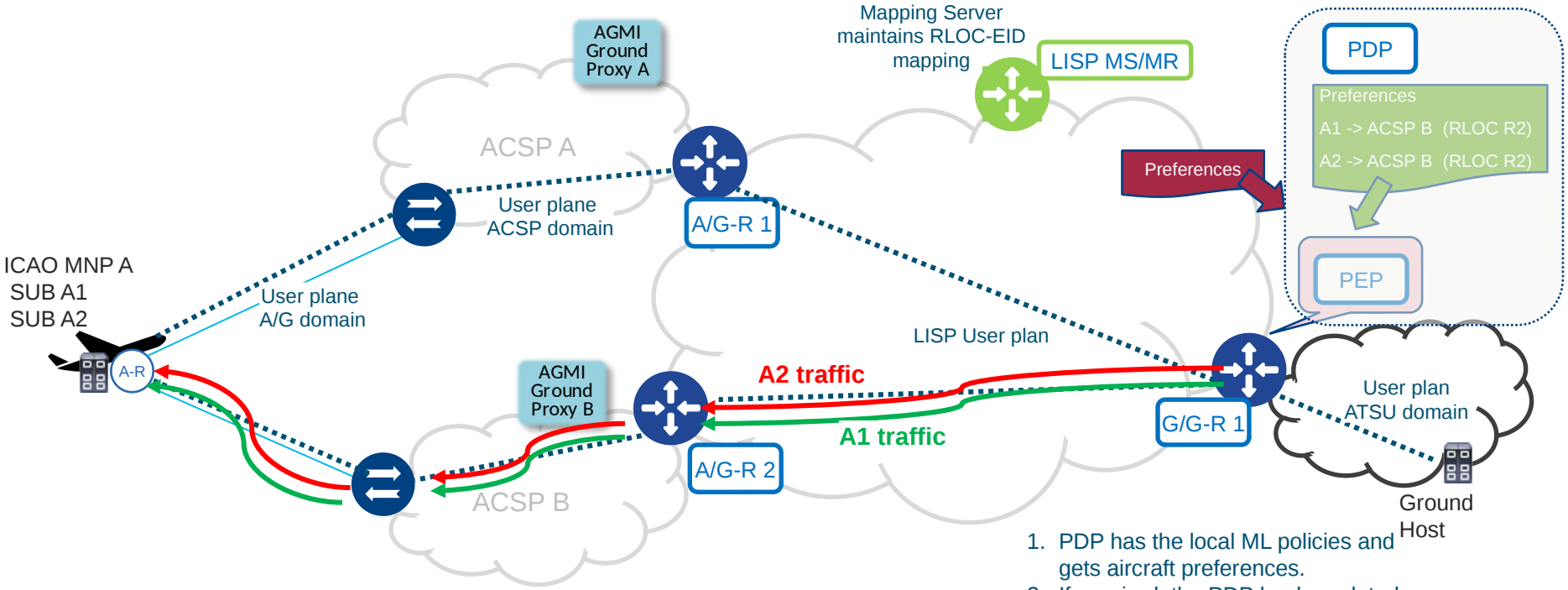
1. G/G-R 1 subscribes to MNP A
2. Via LISP CP the G/G-R 1 receives the aircraft preferences for MNP A and all its SUB-MNPs (A1, A2)

4. In case of a link error the aircraft shall inform the ground via one remaining active link. Safety net called "foreign report"

Ground Based LISP (GBL) – Multilink usage



Ground Based LISP (GBL) - Uplink local policy override



1. PDP has the local ML policies and gets aircraft preferences.
2. If required, the PDP loads updated preferences to the PEP (G/G-R1) -> Uplink local policy override.

GB-LISP standardization in IETF

- Bring RFC 6830 and RFC 6833 to Standard Track (pending since more than 400 days).
  - The aviation community needs standards for LISP Control and Data plane protocols. The lack of these standards is currently a major risk for GB-LISP
- “Publish/Subscribe Functionality for LISP” - > Move from Experimental to Standards Track
  - Detail selective subscribe operations – what happens after deregistration, explicit selective unsubscription, wildcard subscription and unsubscription
  - Add network mobility support – flag network prefixes as fixed or mobile to automatic remove all longer sub-prefixes inside the mapping system
- Include network mobility features to draft-ietf-lisp-eid-mobility
- Transport more information inside LISP
  - 4D trajectory snapshot = timestamp (in seconds) + aircraft 3D coordinates
  - Digital signature from the aircraft for the AGMI Request message
  - “Suggest” messages on foreign report received instead of direct deregistration of a foreign link

Alternative approach: Create an Experimental RFC for multi-link mobility that describes all the needed augmentation and referencing to the generic PubSub and mobility RFCs