

Some insights about possible future IP over DVB encapsulation

S. Combes, S. Josset

Advanced Telecom Satellite Systems

Research Department

Alcatel Space Industries (ASPI) - Toulouse (France)

◆ IP/DVB view

- Short term : MPE +
- Long term : MPE replacement

◆ IST-Brahms results

- IP-Dedicated Satellite Access Scheme
 - What is IP-Dedicated ?
 - Why IP-Dedicated ?
 - Overview: comparison with DVB-RCS* and S-ATM*
 - Principles

◆ Conclusion

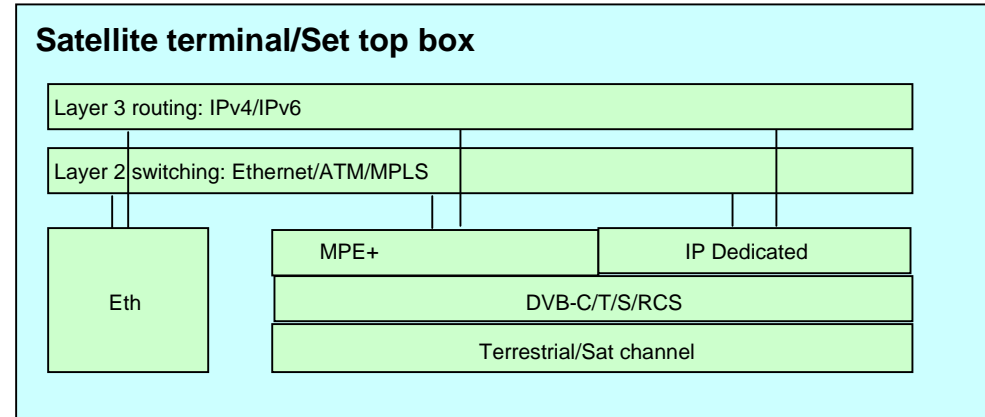
*DVB-RCS = DVB Return Channel for Satellite

*S-ATM = Satellite ATM

◆ Common stack for both terrestrial and satellite

◆ Short term : MPE Enhancement

- Multisource IP multicast
- Ethernet bridging
- MPLS
- Internal studies
 - ➔ PPPoE+Multicast



◆ Long term : MPE replacement

- Ethernet-like stack
- Dynamic ARP based address mapping
- Multicast aware
- Secure layer
- IST-Brahms project : IP-Dedicated (IPv4)
- IST-SAtIP6 project : IP-Dedicated v6 (IPv6)

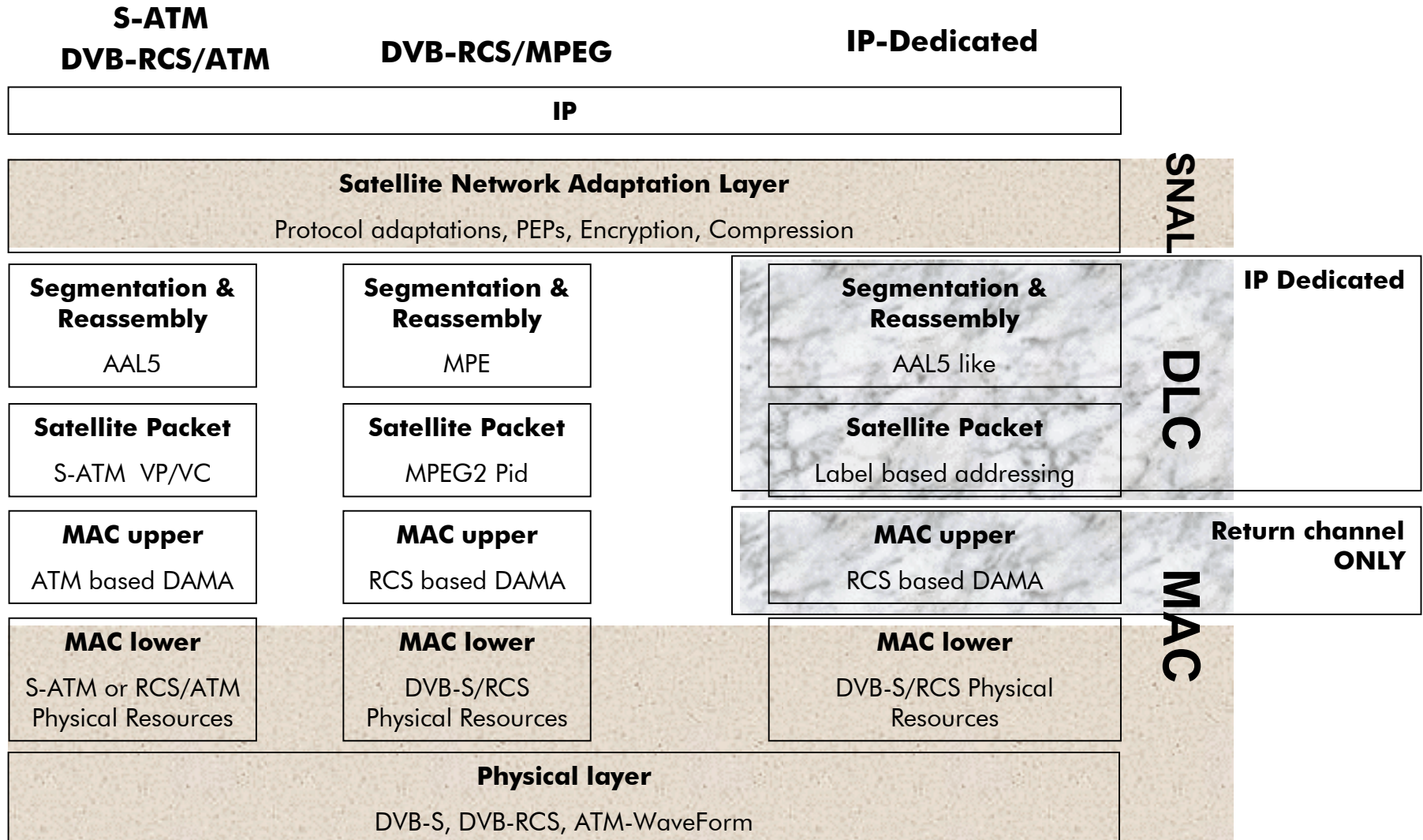
- ◆ IST-Brahms project
 - IST project - 01/2000 to 12/2001 - ASPI prime
 - Partners: Telecom Italia-Lab, France Telecom R&D, Sintef, University of Roma, Mitsubishi, Integrasys
- ◆ IST-Brahms results
 - Deliverables: IP Dedicated Satellite Access Layer
 - Validation platform
- ◆ IP-Dedicated
 - IP/Label mapping
 - S-ARP (Satellite Address Resolution Protocol)
 - Group management
 - Terminal authentication & configuration
 - QoS
 - Multicast Security

What is IP dedicated ?

- ◆ IP dedicated is : A Layer 2 protocol set
 - ❑ Optimized for IP (addressing, configuration, management)
 - ❑ Optimized for Satellite (natural Multicast and Broadcast)
 - ❑ Adapted to both transparent and regenerative satellites
 - ❑ Packet oriented access scheme to star and mesh topologies
 - ❑ DVB-RCS compatible: ATM or MPEG profiles

Why IP dedicated ?

- ◆ There is no ideal solution :
 - ❑ ATM : point to point oriented. Difficult multicast. Complex and not widely accepted signalling.
 - ❑ DVB-RCS: Dedicated to Terminal to Gateway through transparent system, mesh not specified yet, poor multisource multicast.
 - ❑ Some proprietary but limited solutions for transparent systems (VSATs)



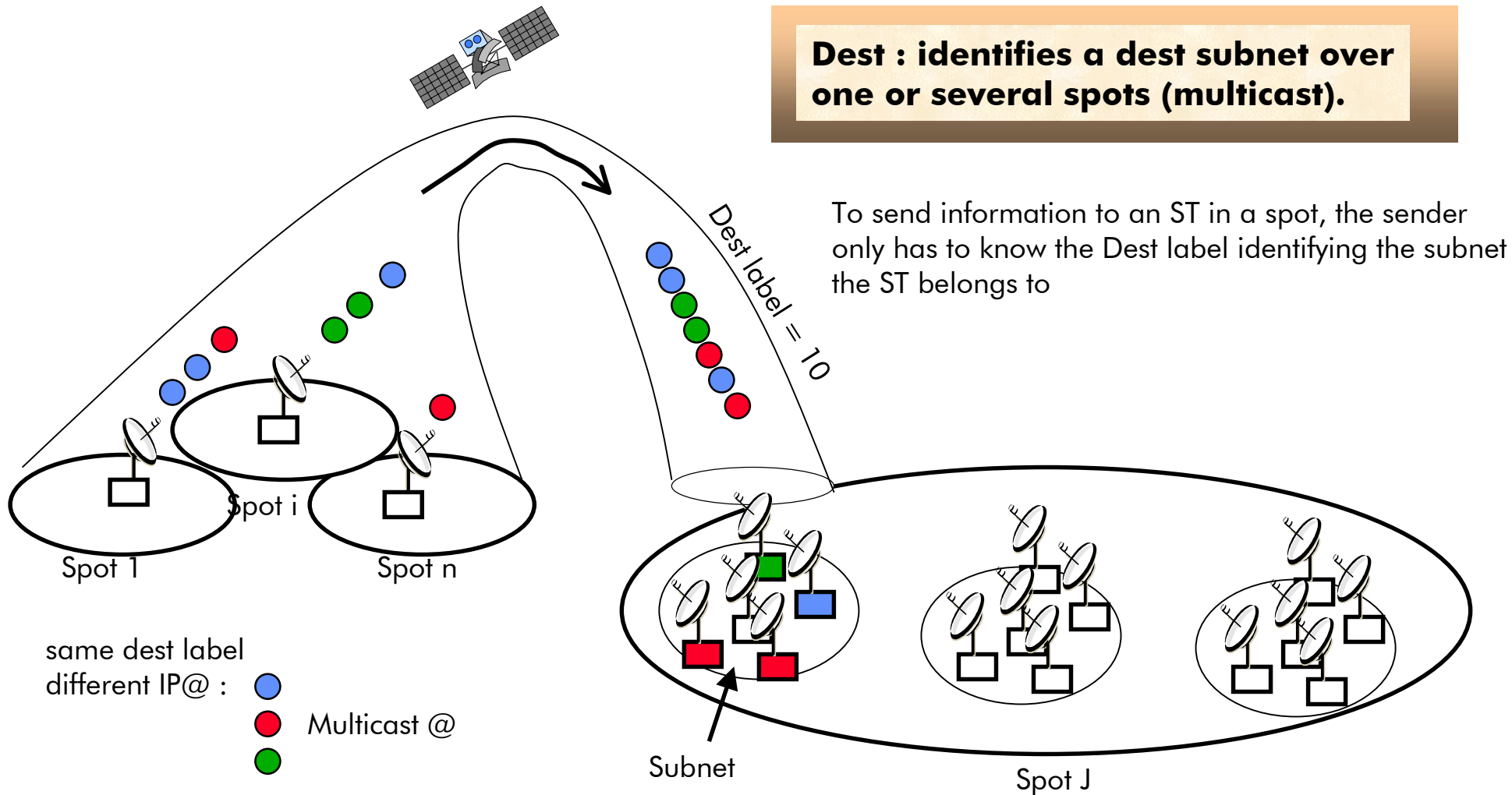
- ◆ Received packets are identified and filtered upon L3 IP source/dest header
 - ➔ **connection set up is not required**
- ◆ However, a simple L2 filtering is added
 - to **reduce L3 processing**
 - to **allow subnetting** (VSN*, VPN*, multicast groups)
 - to **allow simple L2 on-board switching**
- ◆ In a spot, packets destined to STs* belonging to the same « virtual network », have the same L2 label
 - this « virtual network » is called « **subnet** »
 - the L2 label is called « **Dest Label** »

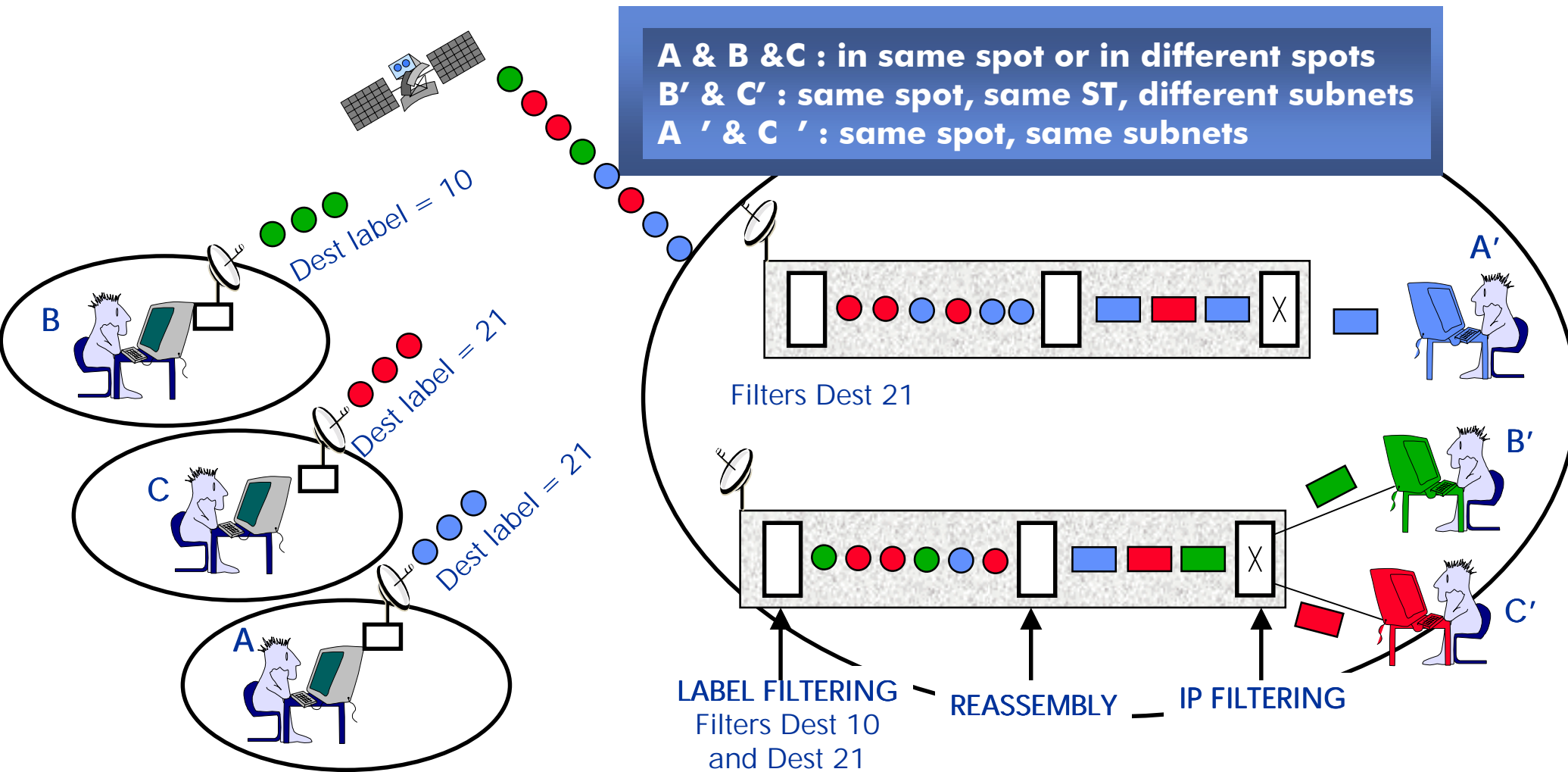
*VSN = Virtual Satellite Network

*VPN = Virtual Private Network

*ST = Satellite Terminal

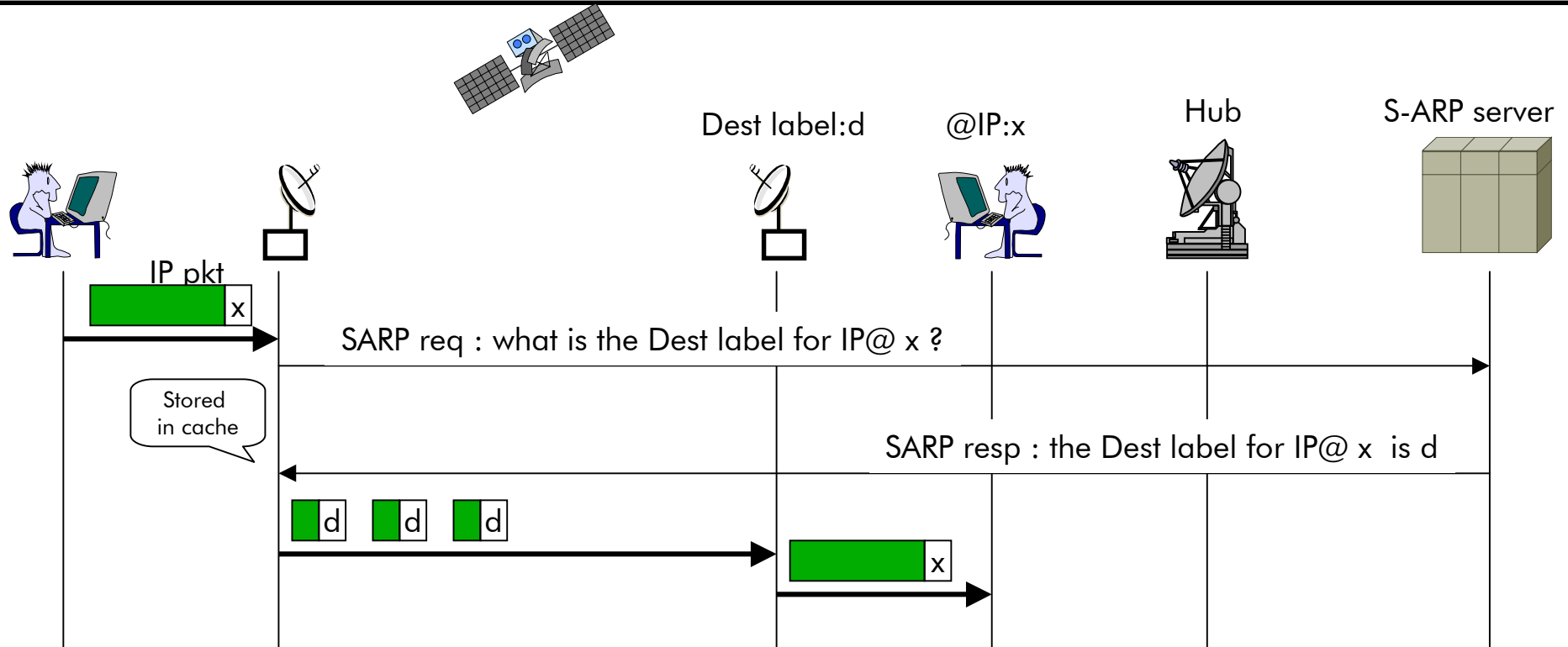
- ◆ A subnet can be spread over several spots
- ◆ A ST can belong to several subnets
- ◆ A subnet needs :
 - One Dest label for each destination spot (unicast & inter-spot multicast subnet)
 - One label per L2 multicast configuration (multicast subnet)
- ◆ ST proceeds in two steps :
 - L2 : filter packets having Dest Labels corresponding to the subnets the users behind the ST belong to
 - L3 : filter packets upon the IP dest@
 - ➔ *Reassembly is performed thanks to specific fields in the packet header*





IP over DVB : IP-Dedicated

How does ST get the Dest label ?



- ◆ All STs know the S-ARP server IP@ and associated Dest label
 - preconfigured or loaded at session establishment
- ◆ ST maintains a cache (IP@ -> Dest label) to reduce S-ARP requests number
- ◆ The S-ARP response can include an IP subnet mask in case the same Label can be used to reach a whole IP subnet : allows to reduce S-ARP signalling

- ◆ This presentation aimed at showing the need for two studies:
 - MPE enhancement (short term)
 - MPE replacement (long term)
 - Ethernet Like layer
 - Taking advantage of multicast mediums
 - Native Security

- ◆ Some work already done by ASPI on MPE replacement
 - IP-Dedicated (IST-Brahms)
 - Some IPR

- ◆ Need for a unique solution
 - Terrestrial & Satellite