Technology Roadmaps

CNS and IM plus Avionics

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Objective

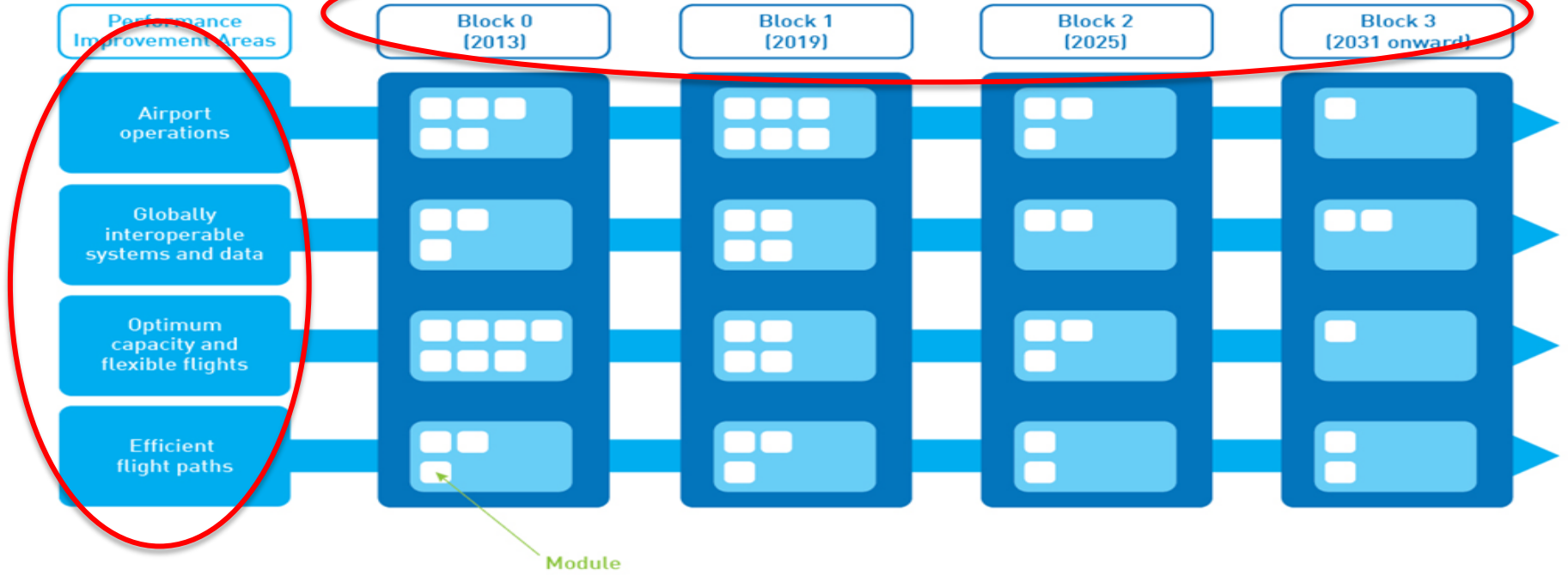*To understand the role of the Tech. Roadmaps and their relationship to the GANP, the ASBUs and the overall planning process.*

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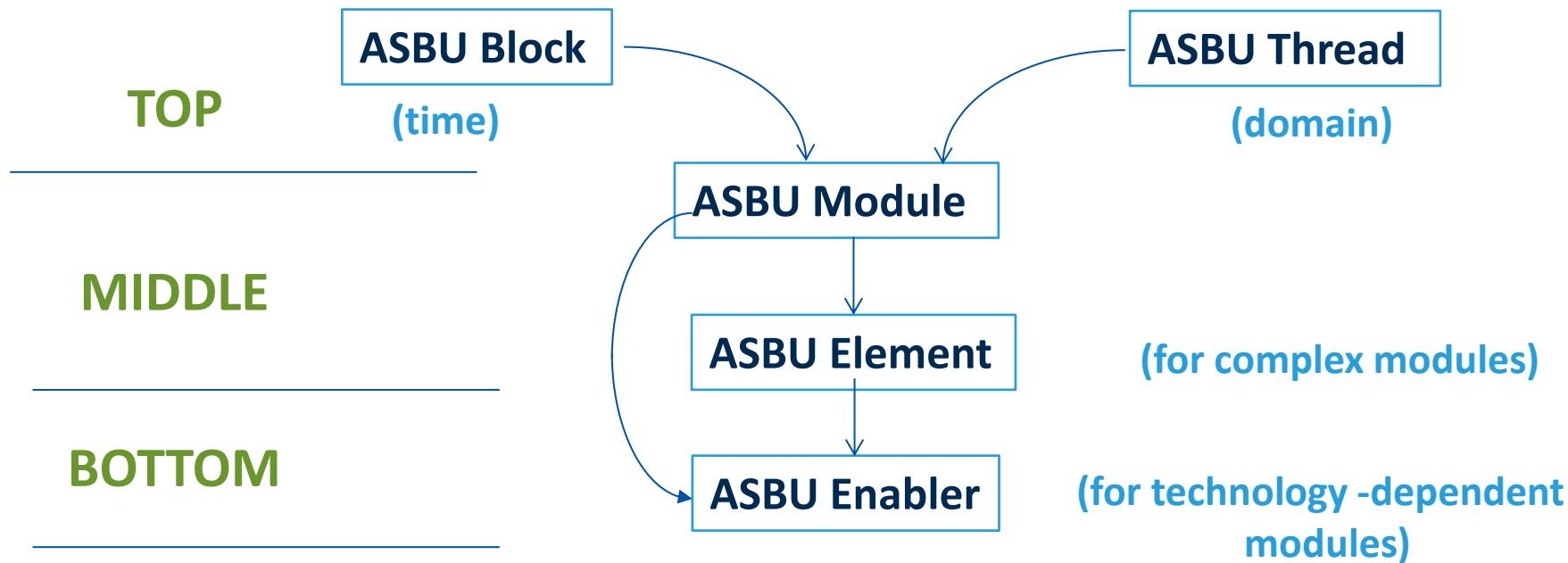
ASBU framework

4 *Performance Improvement Areas*

6-year blocks (new 2016)

Performance Improvement Areas

| Block 0 (2013) | Block 1 (2019) | Block 2 (2025) | Block 3 (2031 onward) |

Airport operations

Globally interoperable systems and data

Optimum capacity and flexible flights

Efficient flight paths

Module

Remember the Key concepts?

We had a Hierarchy

TOP

MIDDLE

BOTTOM

ASBU Block

(time)

ASBU Thread

(domain)

ASBU Module

ASBU Element

(for complex modules)

ASBU Enabler

(for technology -dependent modules)

Yes, a Hierarchy

ASBU Block

ASBU Module

ASBU Element

ASBU Enabler

Yes, there are four!

A total of fifty one.

Some modules have one, some have four!

Varying numbers per module!
(procedures, training, technology, etc.)

- The planning process: *identify gaps and operational improvements required.*
- Identify the appropriate ASBU Module: the appropriate technology will be given in Section 4 : Necessary System Capability.

Lets take B2-SURF

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To improve efficiency and reduce the environmental impact of surface operations, even during periods of low visibility. Queuing for departure runways is reduced to the minimum necessary to optimize runway use and taxi times are also reduced. Operations will be improved so that low visibility conditions will have a minor effect on surface movement.

This module also provides runway safety alerting logic (SURF-IA).

4. Necessary System Capability

4.1 **Avionics**

4.1.1 In addition to the aircraft equipage required by B1-SURF the following aircraft technology is required:
a) data link communications;
b) synthetic vision system; and
c) taxi trajectory guidance capability.

4.1.2 For element 4, ADS-B Out avionics will be required for direct aircraft-to-aircraft surveillance. These capabilities could also be applied to support drivers of equipped ground vehicles. Aircraft will require the availability on board of surface moving map capabilities.

Our Example B2-SURF!

4.2 **Ground systems**

4.2.1 The following ANSP technology is required:
a) initial and enhanced A-SMGCS /Surface traffic management automation;
b) data sharing with air traffic flow management; and
c) data link communications.

4.2.2 This element also requires an airspace user/aerodrome operator technology deployment in the form of an enhanced A-SMGCS/collaboration capability with ANSP surface traffic management capability.

4.2.3 For element 4 (SURF-IA), it is essential to have a complete traffic situation on the runway and either a mandatory carriage of ADS-B Out and/or TIS-B ground stations are required.

The answer???

- Data Link Communications

- ADS-B In/Out *(with qualifications)*

- PLUS varying levels of Automation;
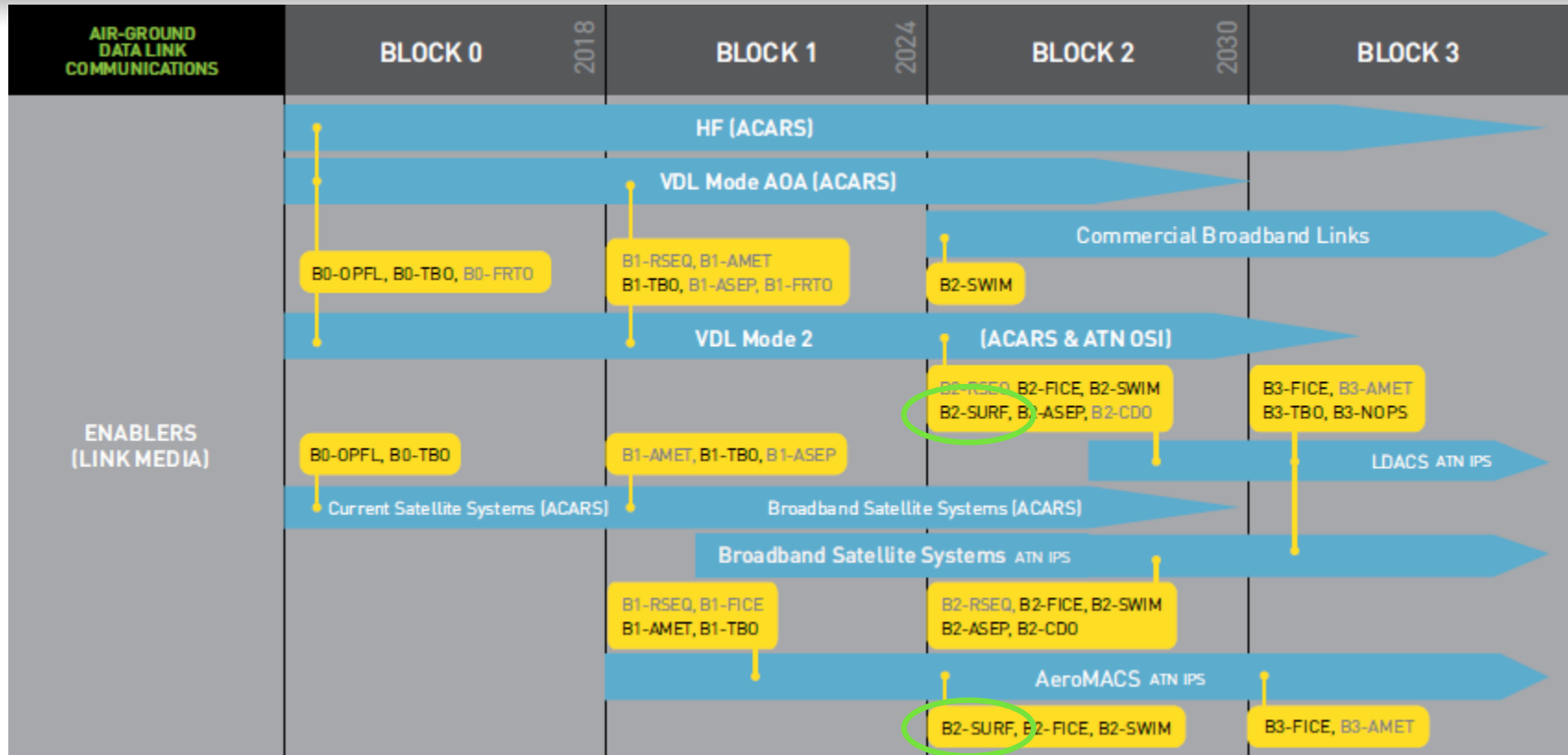 (Not clear as it is yet to be developed)

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- Data Link Communications

- ADS-B In/Out *(with qualifications)*

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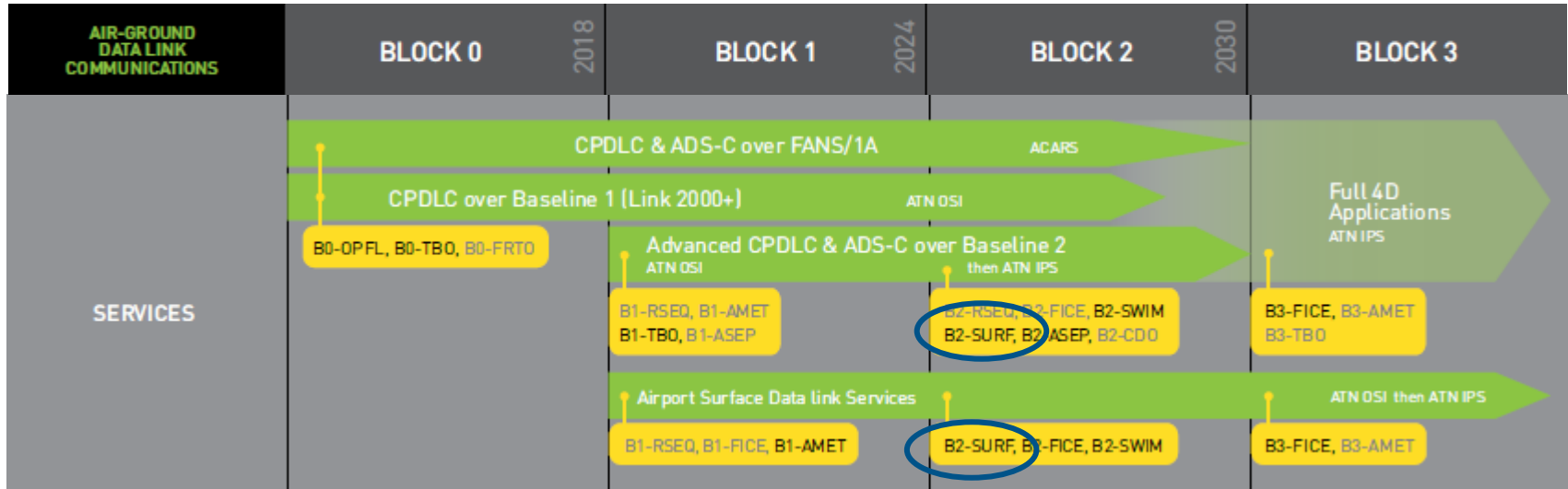
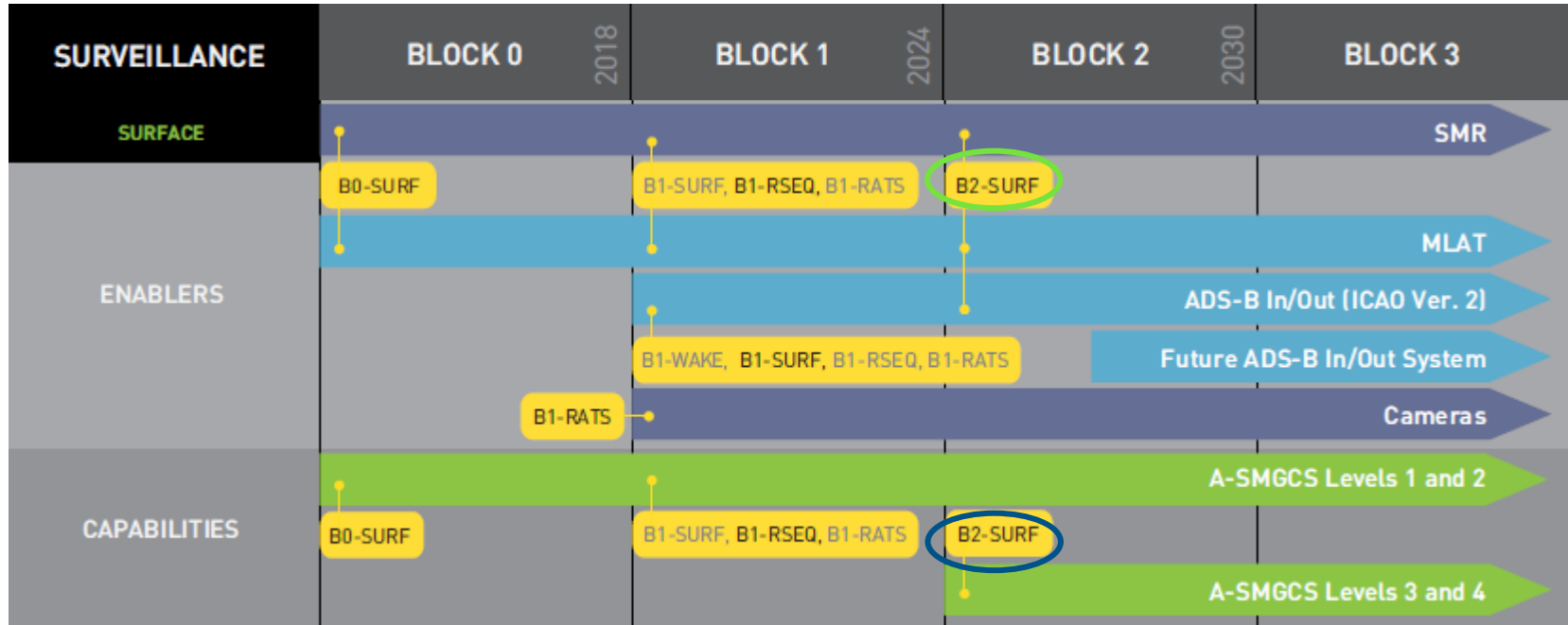*However quickly consulting the roadmaps tells us more!*
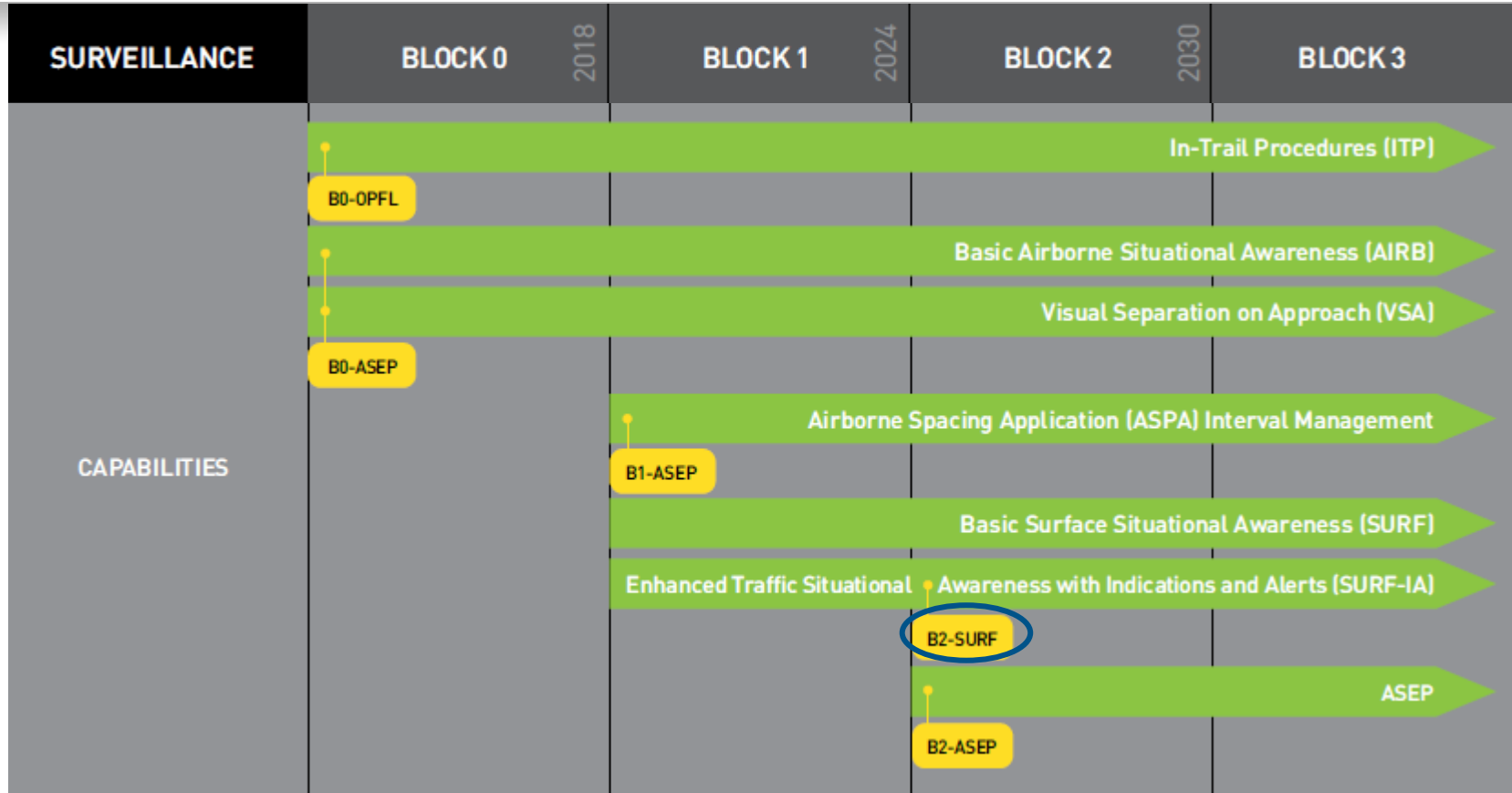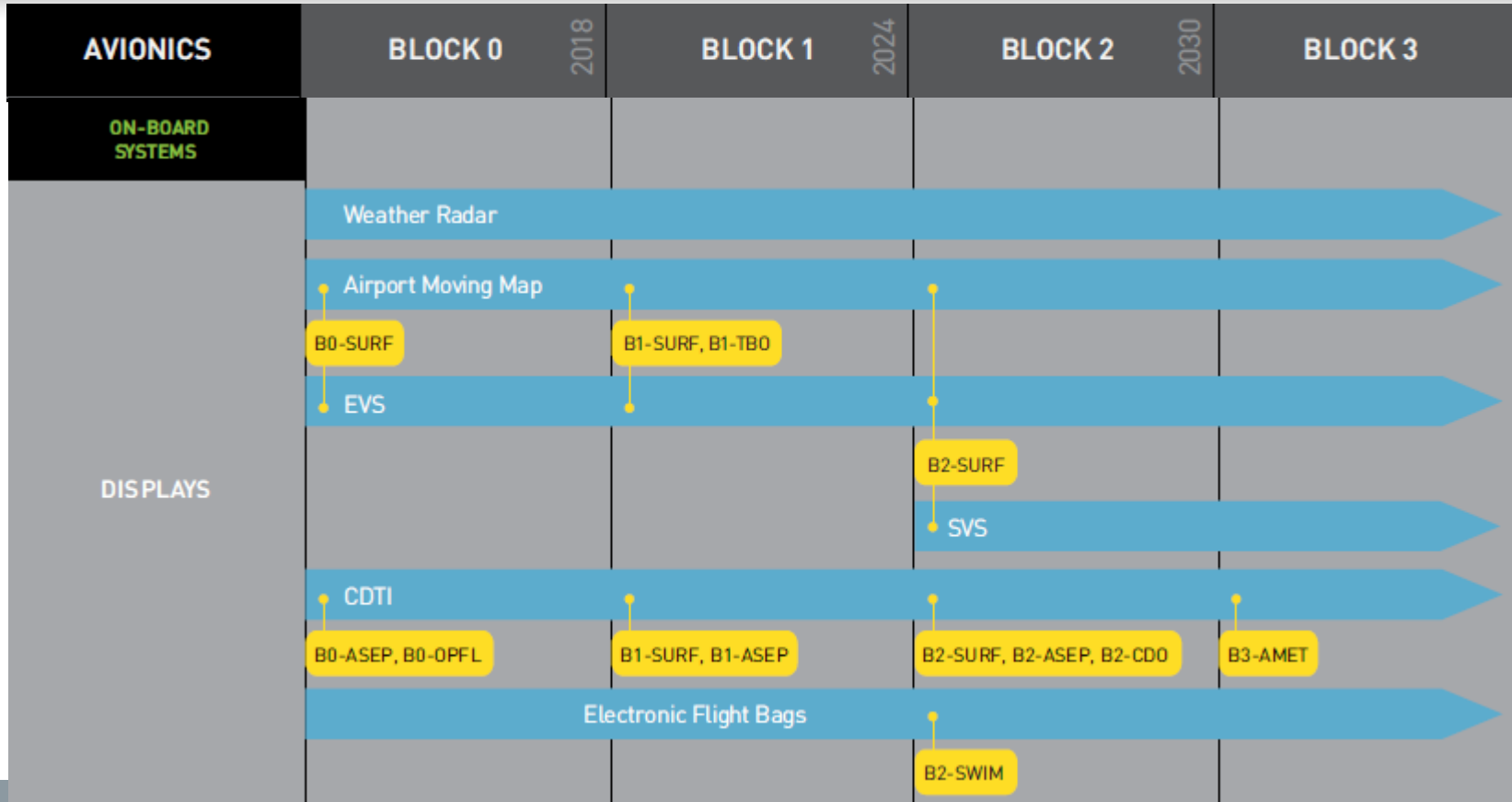
The First Roadmap

More from the same Roadmap

From Roadmap 5

SURVEILLANCE	BLOCK 0	2018	BLOCK 1	2024	BLOCK 2	2030	BLOCK 3
SURFACE							SMR
	B0-SURF		B1-SURF, B1-RSEQ, B1-RATS		B2-SURF		
ENABLERS							MLAT
							ADS-B In/Out (ICAO Ver. 2)
			B1-WAKE, B1-SURF, B1-RSEQ, B1-RATS				Future ADS-B In/Out System
	B1-RATS						Cameras
CAPABILITIES							A-SMGCS Levels 1 and 2
	B0-SURF		B1-SURF, B1-RSEQ, B1-RATS		B2-SURF		
							A-SMGCS Levels 3 and 4

AVIONICS	BLOCK 0	2018	BLOCK 1	2024	BLOCK 2	2030	BLOCK 3
ON-BOARD SYSTEMS							
	Weather Radar						
	Airport Moving Map						
	B0-SURF		B1-SURF, B1-TBO				
	EVS						
					B2-SURF		
					SVS		
DISPLAYS	CDTI						
	B0-ASEP, B0-OPFL		B1-SURF, B1-ASEP		B2-SURF, B2-ASEP, B2-CDO		B3-AMET
	Electronic Flight Bags						
					B2-SWIM		

The Roadmaps can also tell us more.

What else can I do with a given technology??

- Can I support other modules/elements??
- Which technology will give me more "bang for my buck"??
- Can it change my cost/benefit analysis?

So what did that tell us??
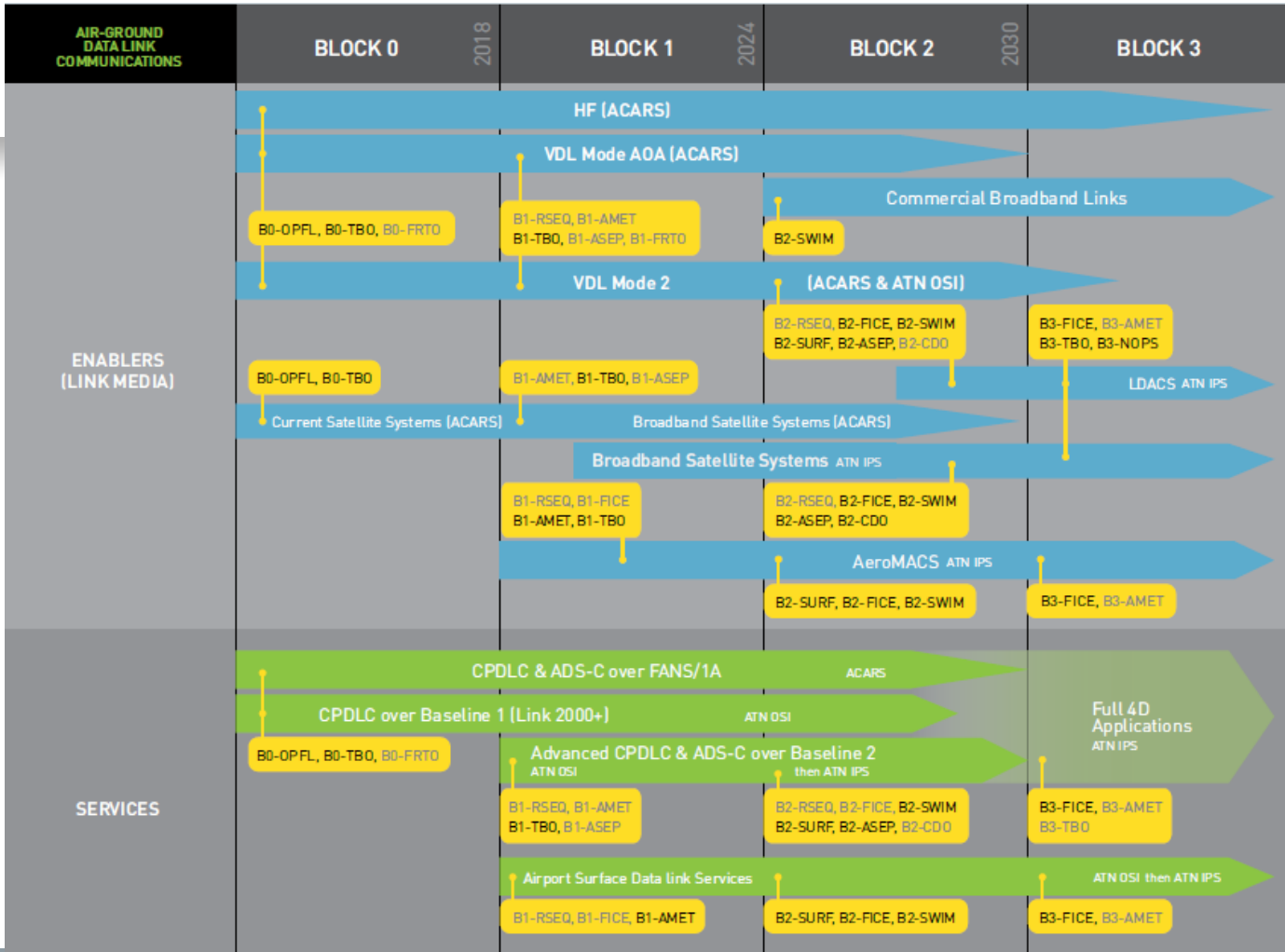
- Some technologies can support up to *six "modules"!*

- At any given point in time, there may be *multiple technology options*.

- In some (operational) environments a technology may be *"essential"* in others, *"highly desirable"*

….and what else???

- **We have 10 roadmaps.**
  - *With more to come*
- **Each one is different.**
  - *We did say that is was multidisciplinary and included both air and ground systems.*

Let's explore more!

DOMAIN	COMPONENTS	ROADMAP
Communication	Air-ground data link communications	1
	Ground-ground communications	2
	Air-ground voice communications	
Navigation	Dedicated technology	3
	Performance-based navigation	4
Surveillance	Ground-based surveillance	5
	Surface surveillance	
	Air-air surveillance	6
Information management	SWIM	7
	Flight & Flow	
	AIS/AIM	
	Meteorology	
	Time	
Avionics	Communications	8
	Surveillance	
	Navigation	9
	Airborne safety nets	10
	On-board systems	

First how to read the roadmap