

PRODIGE PROCESSORS FAMILY: FROM 5G/6G TO GNSS & PNT APPLICATIONS

EDHCP-16TH OCTOBER 2025

ALVARO CORTES, CARLOS ABAD, MARGARITA MARTÍNEZ, JUAN-MANUEL RODRÍGUEZ, PHD & RAUL REGADA



PRODIGE PRODUCT FAMILY

/// PRODIGE: SOFTWARE DEFINED PLATFORM FOR MULTIPURPOSE PROCESSING

Enable the functional or service evolution along the mission lifetime

Modular building blocks allows full flexibility in function definition and implementation

Better over time: over-the-air-upgrades during the mission for performances / functionalities enhancement



COMPONENTS TECHNOLOGY

Best compromise of components selection for high-performance and in flight reconfiguration with flight heritage



MODULAR AND SCALABLE

Reliable blocks allow full flexibility in functional definition and implementation (I/O frequencies, nb of channels, BW,...)



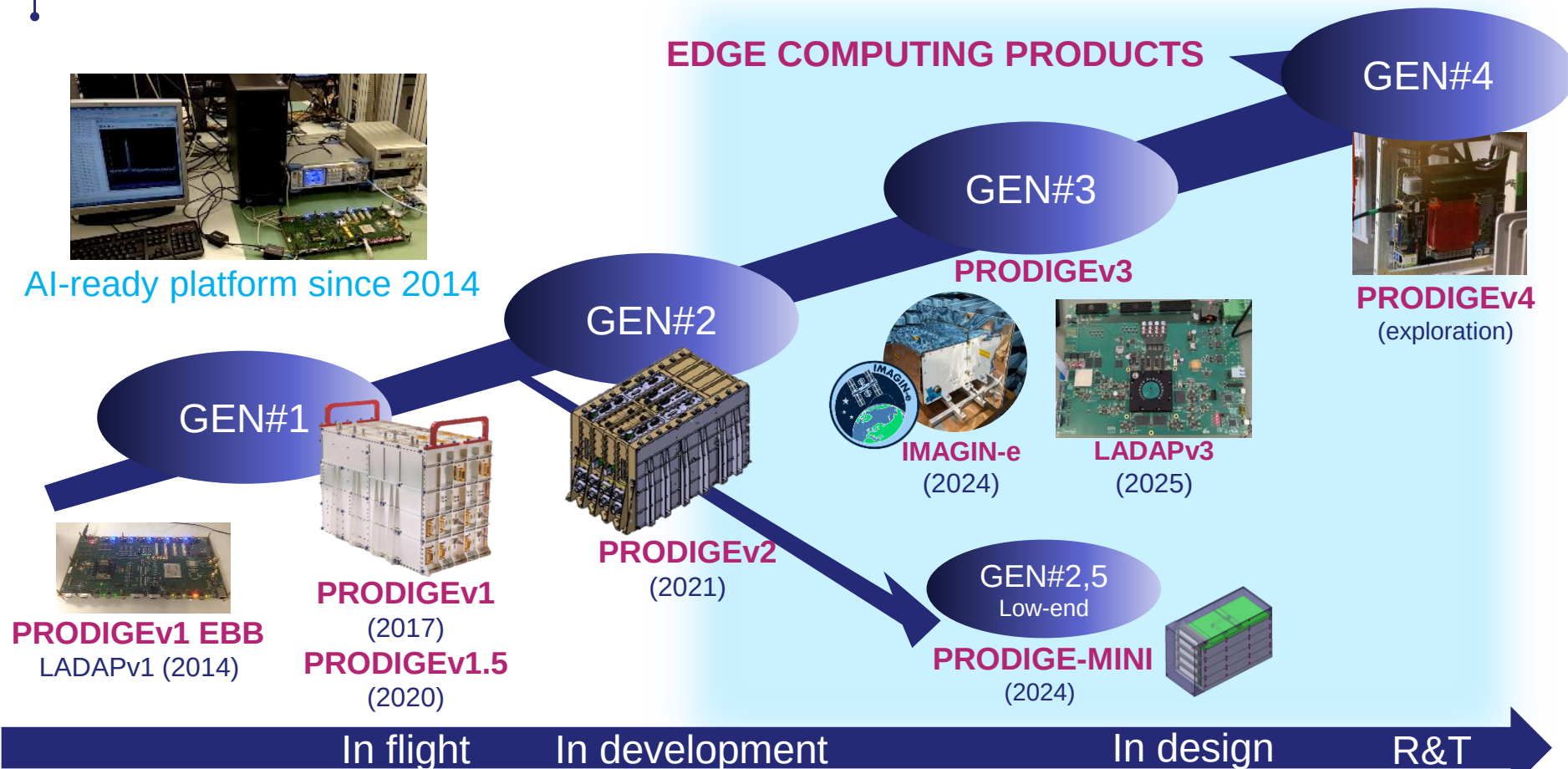
OVER THE AIR UPGRADES

Resilience to market evolution and regulation changes



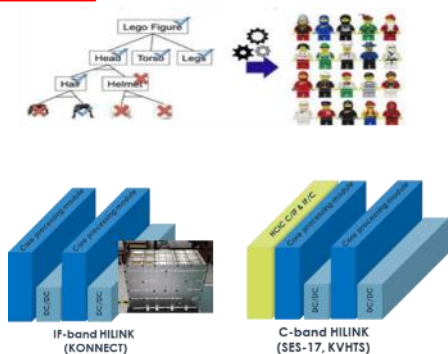
MULTIPURPOSE SOFTWARE DEFINED PROCESSING PLATFORMS

EDGE COMPUTING PRODUCTS

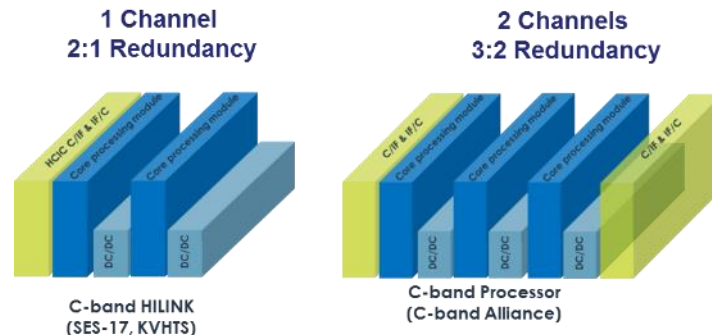


Prodige family share 4 key architectural principles

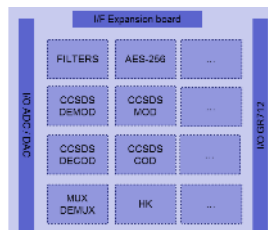
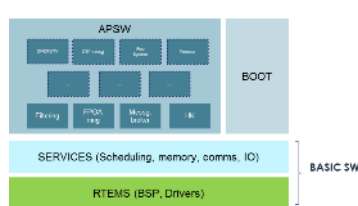
MODULARITY



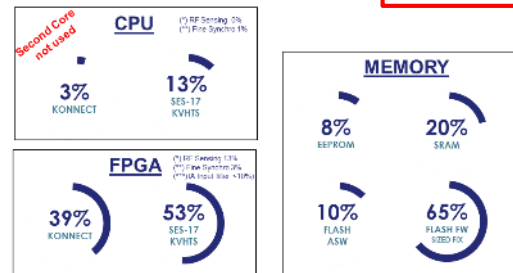
SCALABILITY



SW-DEFINED



GROWTH POTENTIAL



PRODIGE v1.X PRODUCT FAMILY HISTORY

v1.0

v1.0

v1.0

v1.0

v1.5

v1.5

Site diversity

SB NEO
Konnect for Africa

High speed link

SB NEO VHTS
Konnect VHTS, SES-17,
E10B, SNG...

UHF processor

SPAINSAT NG,
Eutelsat 36D

CTEG

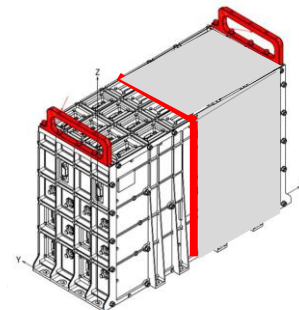
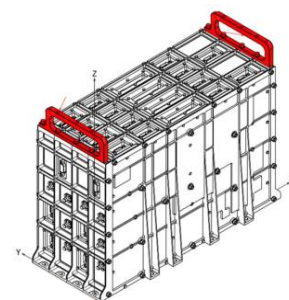
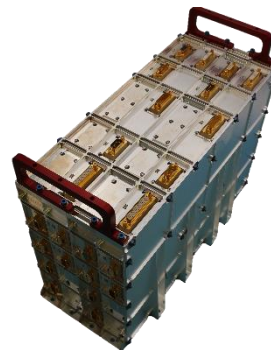
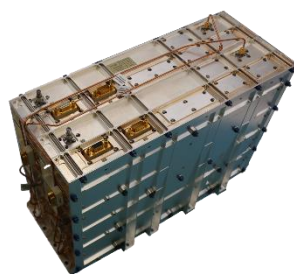
Amazonas Nexus

Inter-satellite link

processor
Galileo 2G

Data processing

unit
CHIME



ThalesAlenia
Space

eutelsat

ThalesAlenia
Space

eutelsat

SES[^]
beyond frontiers

hisdeSAT

AIRBUS

ThalesAlenia
Space

hispasat

esa

GALILEO

esa

opennicus

21 FMs already contracted (2016-2022), 7 delivered, 3 currently in flight

Date: 20/10/2025

Ref: Corporate presentation

Template: 87201590-QCI-TAS-EN-007

PROPRIETARY INFORMATION

This document is not to be reproduced, modified, adapted, published, translated in any material form in whole or in part nor disclosed to any third party without the prior written permission of Thales Alenia Space.

© Thales Alenia Space, 2025. All rights reserved.

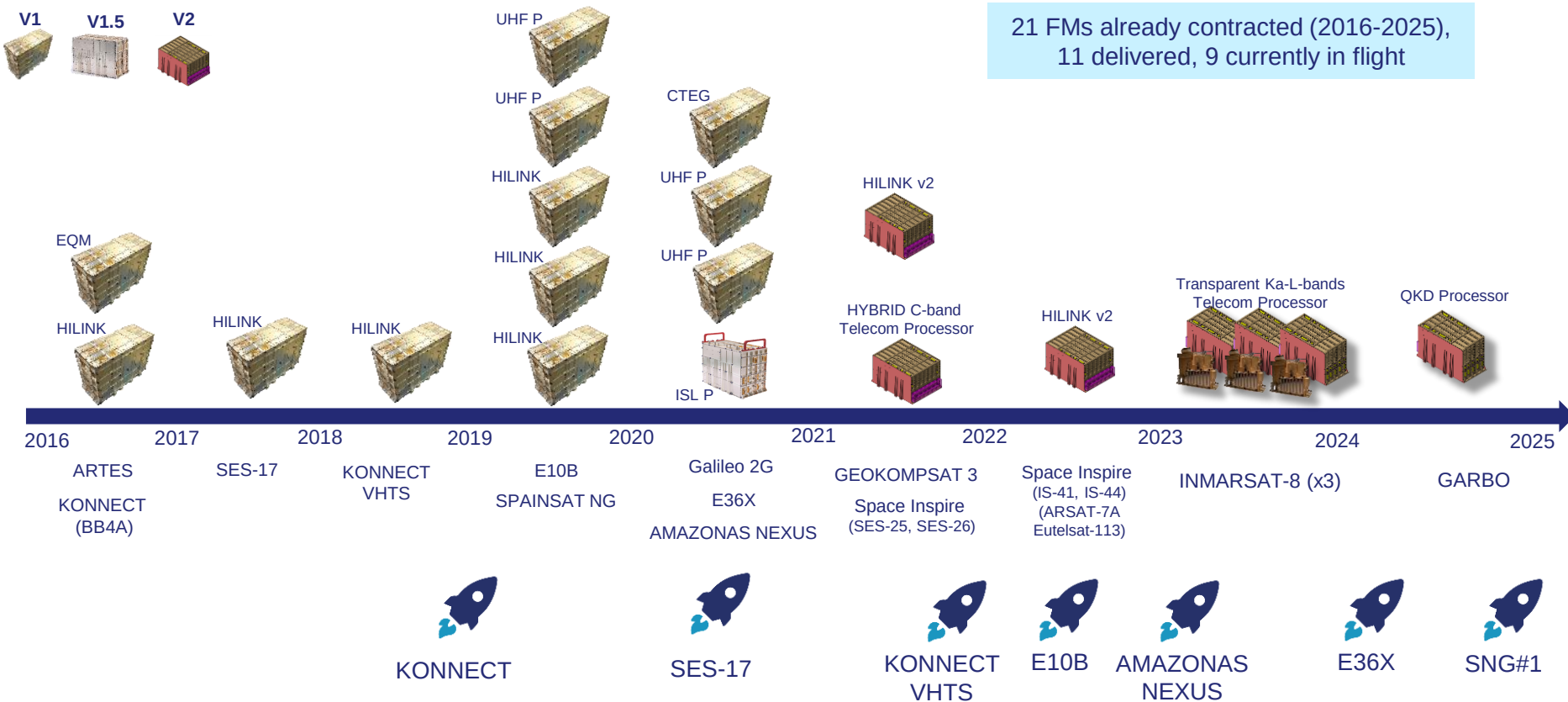
THALES ALLENIA SPACE LIMITED DISTRIBUTION

THALES ALLENIA SPACE LIMITED DISTRIBUTION

ThalesAlenia
Space

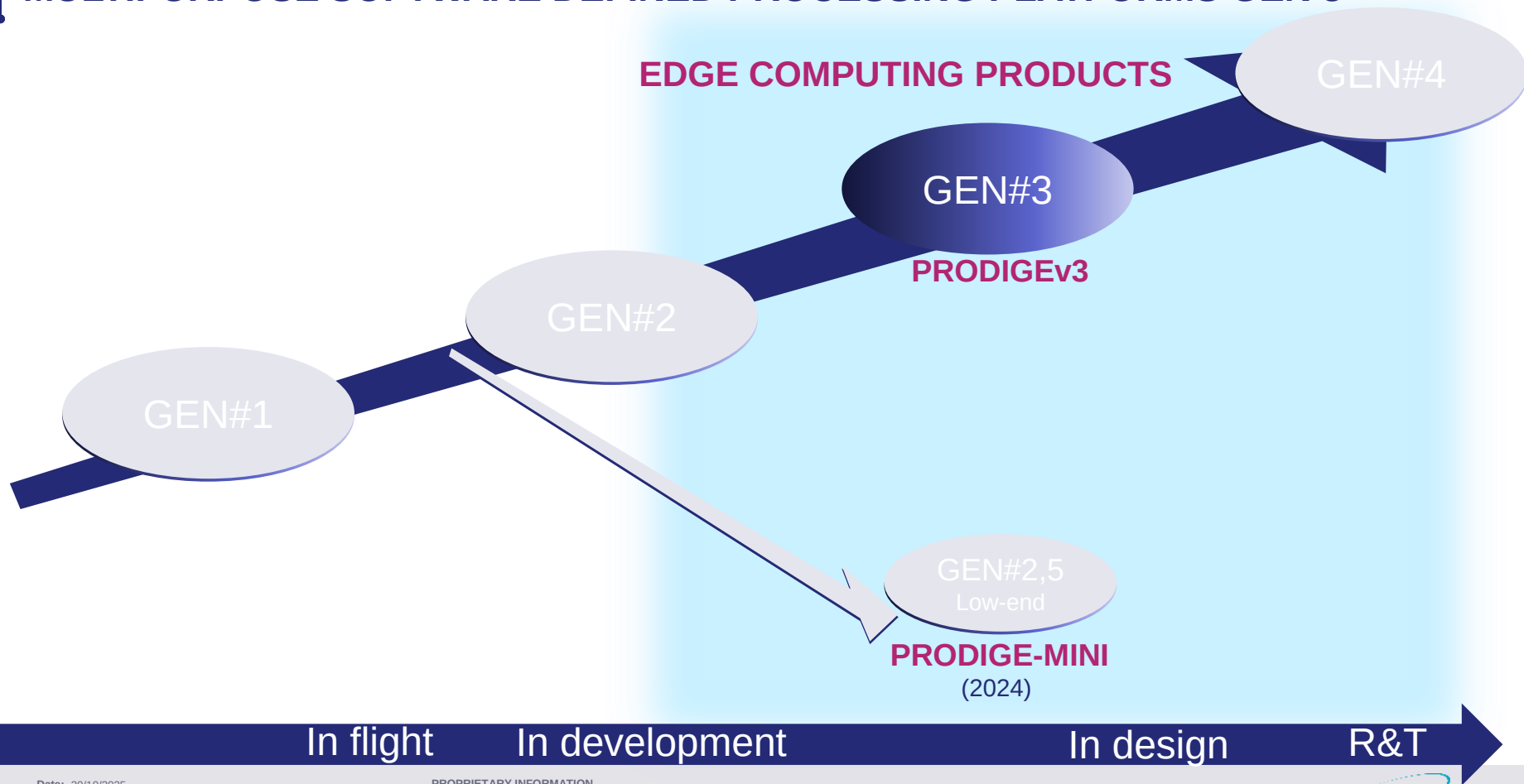
© Thales / Leonardo company

PRODIGE CONTRACTS SO FAR



MULTIPURPOSE SOFTWARE DEFINED PROCESSING PLATFORMS GEN 3

EDGE COMPUTING PRODUCTS



Date: 20/10/2025

Ref: Corporate presentation

Template: 87201590-QCI-TAS-EN-007

PROPRIETARY INFORMATION

This document is not to be reproduced, modified, adapted, published, translated in any material form in whole or in part nor disclosed to any third party without the prior written permission of Thales Alenia Space.
© Thales Alenia Space, 2025. All rights reserved.

THALES ALLENIA SPACE LIMITED DISTRIBUTION

5G RELEASES & ROUTEMAP



Rel-17 5G NTN

Rel-18 5G-Adv NTN

Rel-19 5G-Adv NTN

Rel-20 6G

/// 5G expected evolution along the 3GPP releases

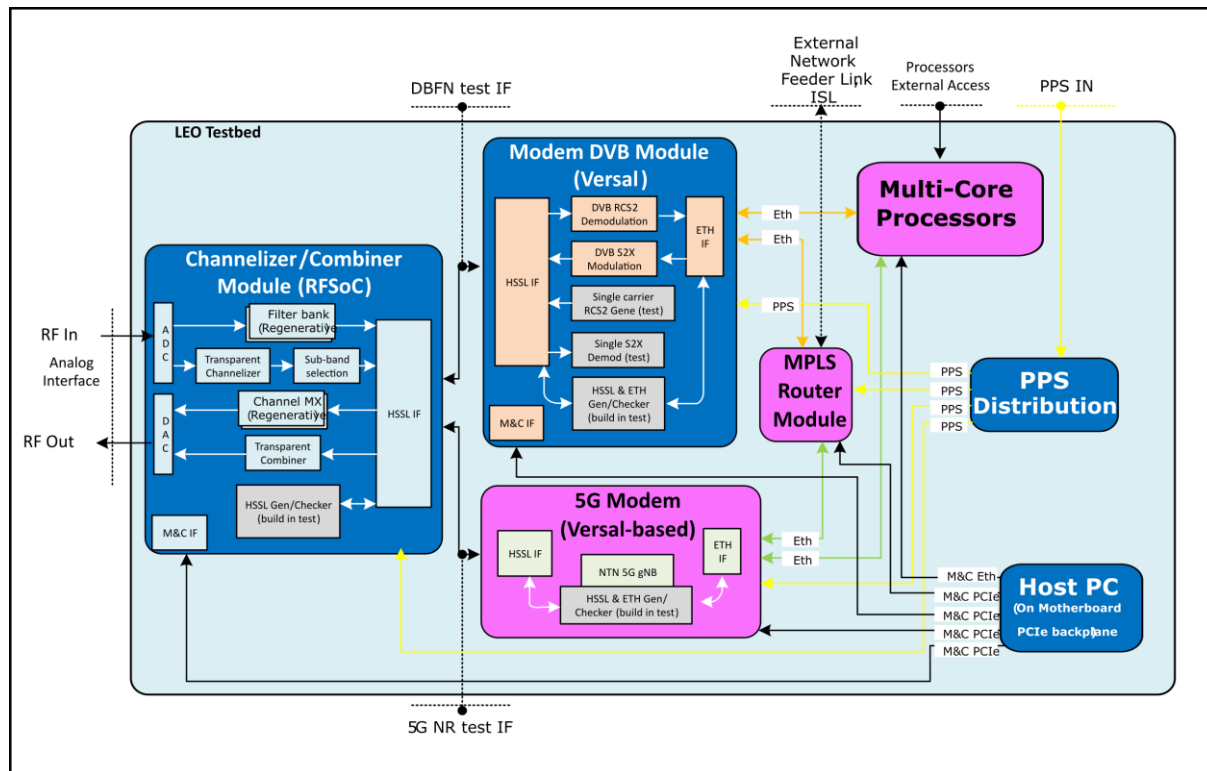
- Release 15 of 3GPP defines for the first time an access network (NR) and a Core Network (5GC) with 5G specifications. In particular, it addresses the requirements derived from the eMBB and uRLLC use case scenarios.
- In Release 16, some improvements are introduced in the previous scenarios, especially in uRLLC. For the time being, mMTC is addressed through the connection of NB-IOT and LTE-MTC technologies to the 5GC.
- Special attention is given to various specific applications that may be important for the deployment and implementation of 5G networks.
- Releases 17 and 18, from 2022 and 2024 respectively, represent the transition to 5G-Advanced, with significant improvements such as the extension of the FR2 range, NTN systems, and RedCap devices.

SYSTEM DIAGRAM – LEO REGENERATIVE TESTBED

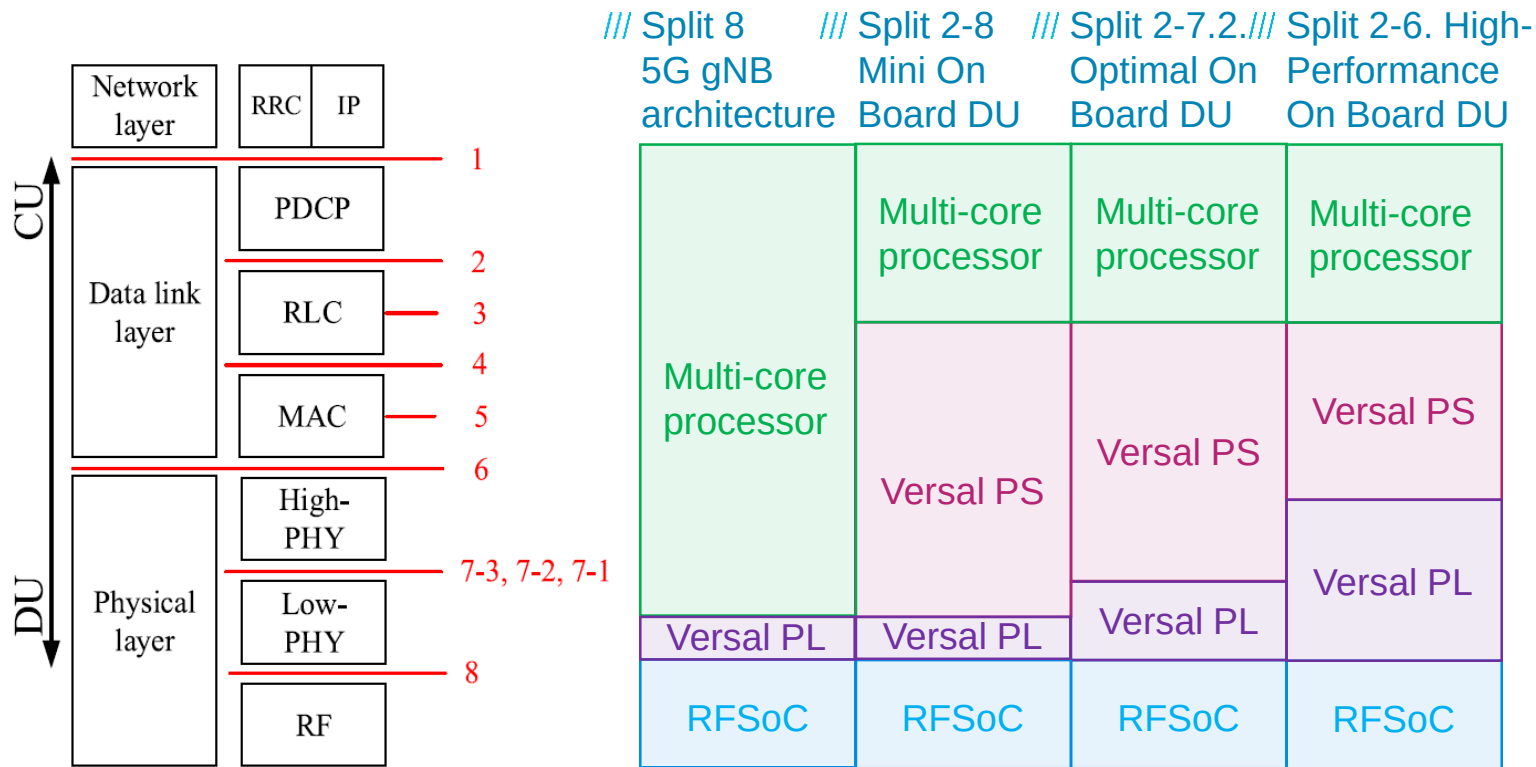
/// LEO REGENERATIVE TESTBED functionality diagram.

Breakdown of development into blocks:

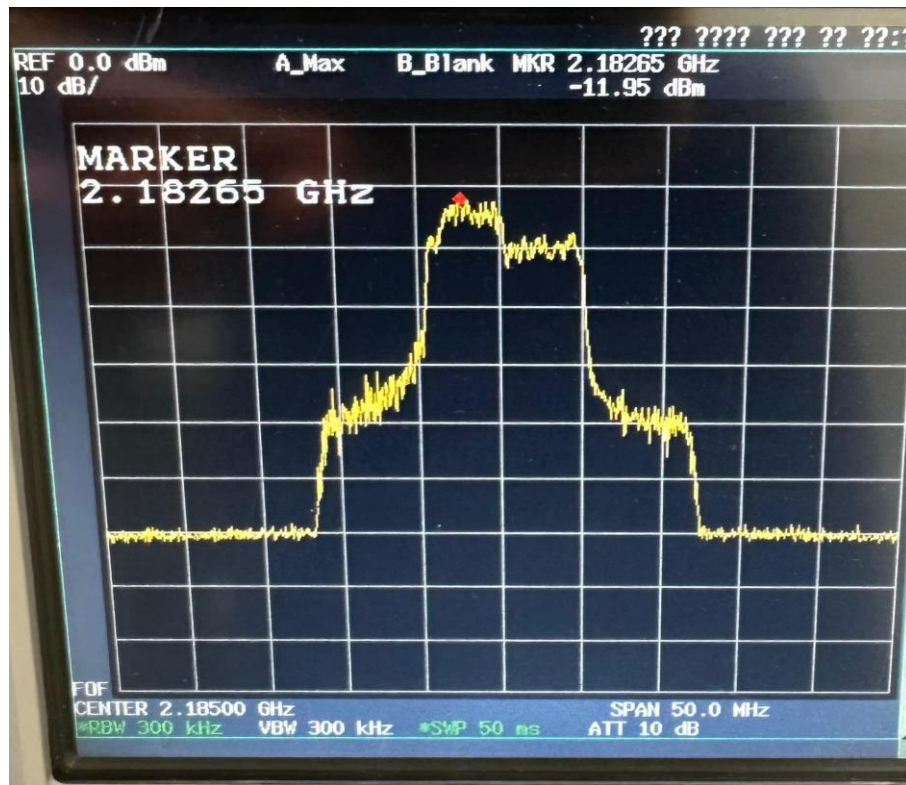
- **Interface units:**
HSSL IF, Ethernet IF.
- **Modulation & Processing units:**
DVB S2X, DVB RCS2, 5G, Channelizer, Combiner and MPLS Router.
- **Test functions:**
RCS2 Generator, S2X Checker, HSSL & Ethernet Generator and Checker



3. GNB ARCHITECTURE ROUTEMAP



PRELIMINARY RESULTS



PRELIMINARY RESULTS

/// Test environment architecture for the 5G RF analysis signals N256 band from gNB

Figure. 1

Preliminary test results

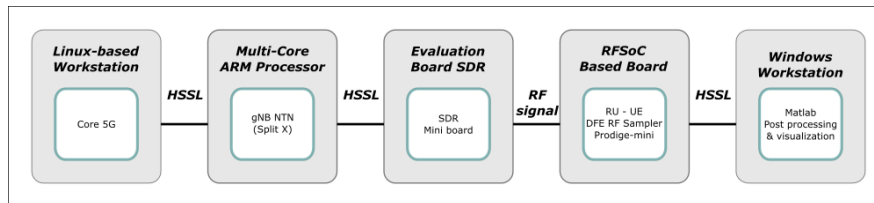


Figure. 6

Final test results

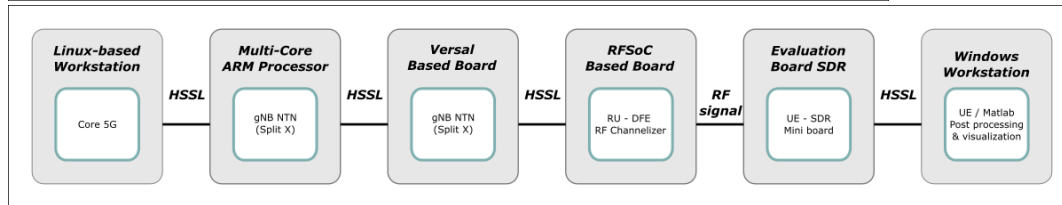


Figure. 2



Figure. 3

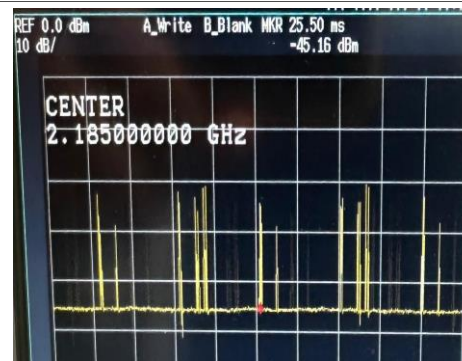


Figure. 4

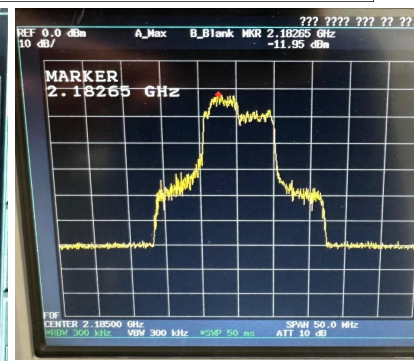


Figure. 5

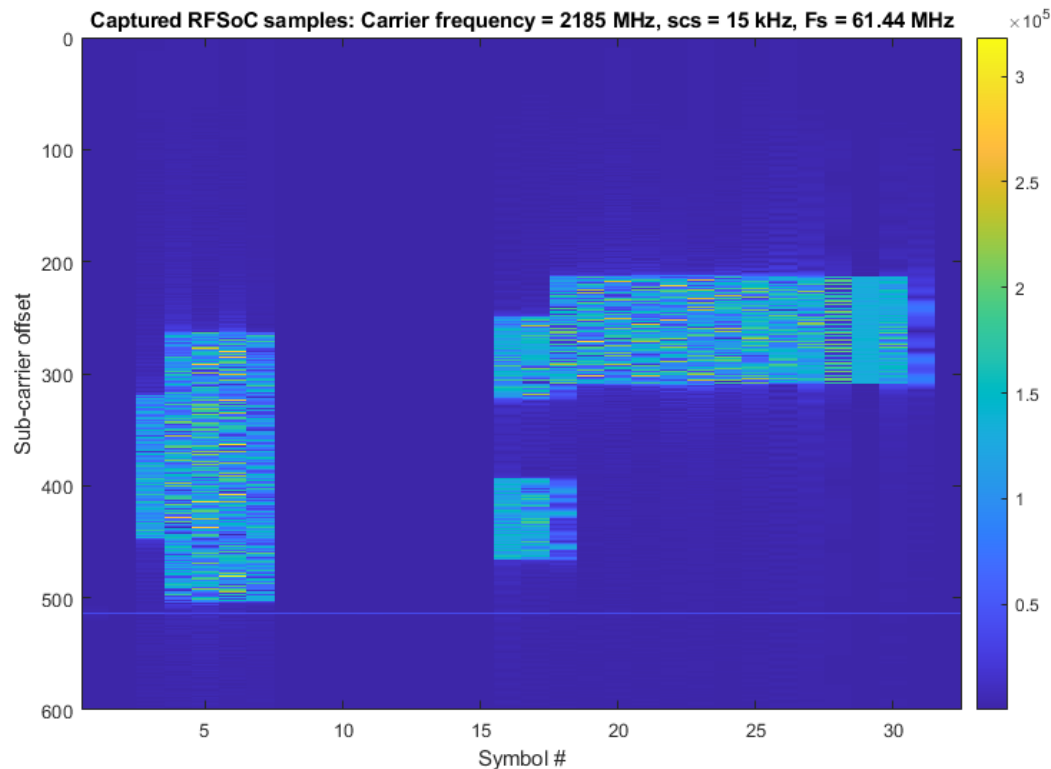
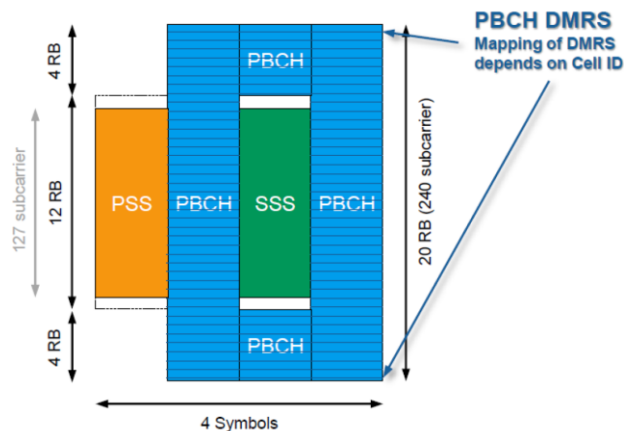
PRELIMINARY RESULTS

/// SSB. Sync Signal Block.

- PSS. Primary Sync Signal.
- SSS. Secondary Sync Signal.
- PBCH. Physical broadcast Channel.

/// SSB - PDCCH & PDSCH tx for SIB1

- PDCCH sends instructions and control info
- PDSCH delivers data content.



SUMMARY

1

Prodige family of multi purpose processors capable to run High Perform applications regarding the space segment.

2

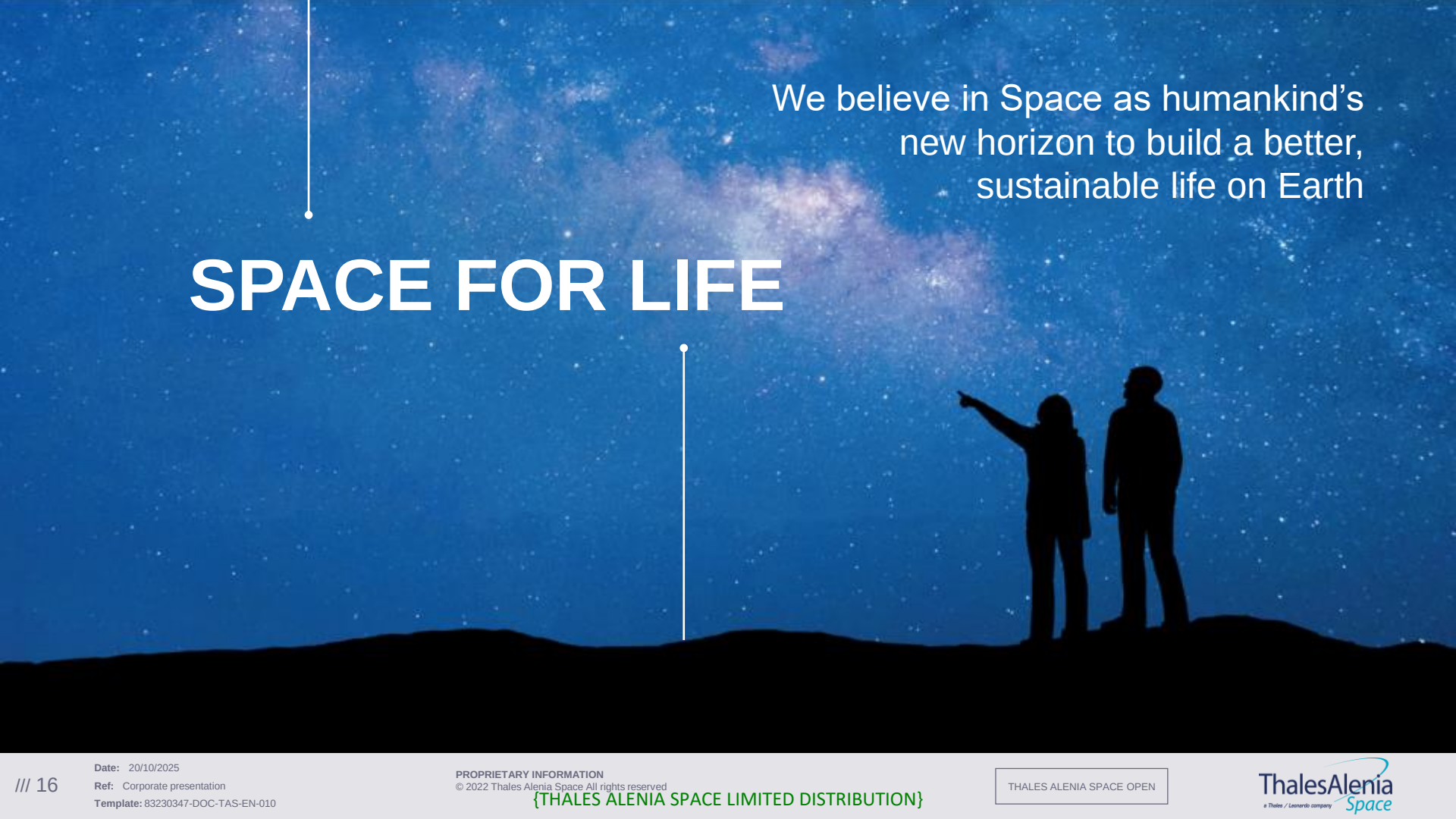
5G/6G Multiple splits generation Split-8 Split-7.2 Split-6 Split-2 to validate the resources and capabilities and adapt the solution to the final approach.

3

Analyze the capabilities of the distributed computing along the Multi-Core processors the Versal-based system combined with different ADC/DAC or RFSoc-based resources and capabilities.

4

Analyze to get the optimal architecure along the on-board and on-ground distribution.



We believe in Space as humankind's
new horizon to build a better,
sustainable life on Earth

SPACE FOR LIFE





THALES ALENIA SPACE IN SPAIN

C/Einstein, 7 (P.T.M.)
28760 Tres Cantos
Madrid - SPAIN

Tel.: (+34) 91 807 79 00

Fax: (+34) 91 807 79 99

E-mail: comunicacion.espacio@thalesaleniaspace.com

<http://www.thalesaleniaspace.com>

Date: 20/10/2025

Ref: Corporate presentation

Template: 83230347-DOC-TAS-EN-010

PROPRIETARY INFORMATION

© 2022 Thales Alenia Space All rights reserved

{THALES ALENIA SPACE LIMITED DISTRIBUTION}

THALES ALENIA SPACE OPEN

ThalesAlenia
Space
a Thales / Leonardo company