The STC : A Solution for SBAS/LPV Implementation

Noud Schoffelmeer

Program Manager

Fokker Services Group

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A short introduction of Fokker Services Group

Fokker Services Group is an independent aviation aftermarket company with a global reach. Providing comprehensive solutions from its five facilities in Europe, Asia and the Americas, Fokker Services Group is a key partner for regional, narrow-body and wide-body platforms in the Commercial, VIP, Cargo and Defense markets. Fokker Services Group ensures the continued competitive operation of its customers' fleet.

Business areas

Aftermarket integrator with design, production, maintenance and airworthiness expertise, supporting commercial and defence operators around the world.

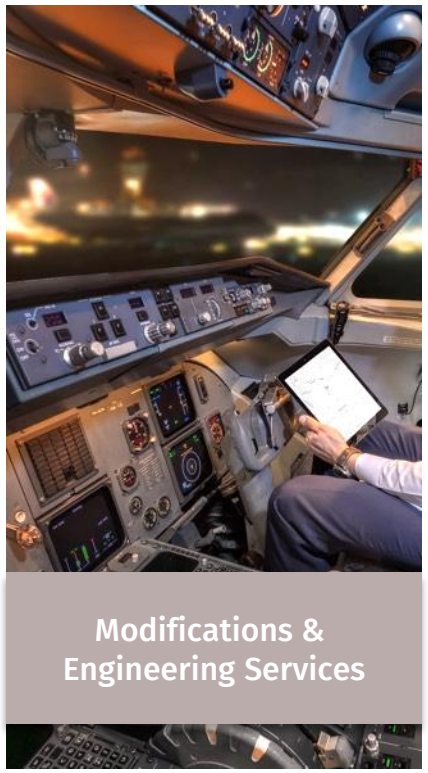
EASA Part 21J (DOA)

Aircraft Completion & Conversion Services

Airframe Services

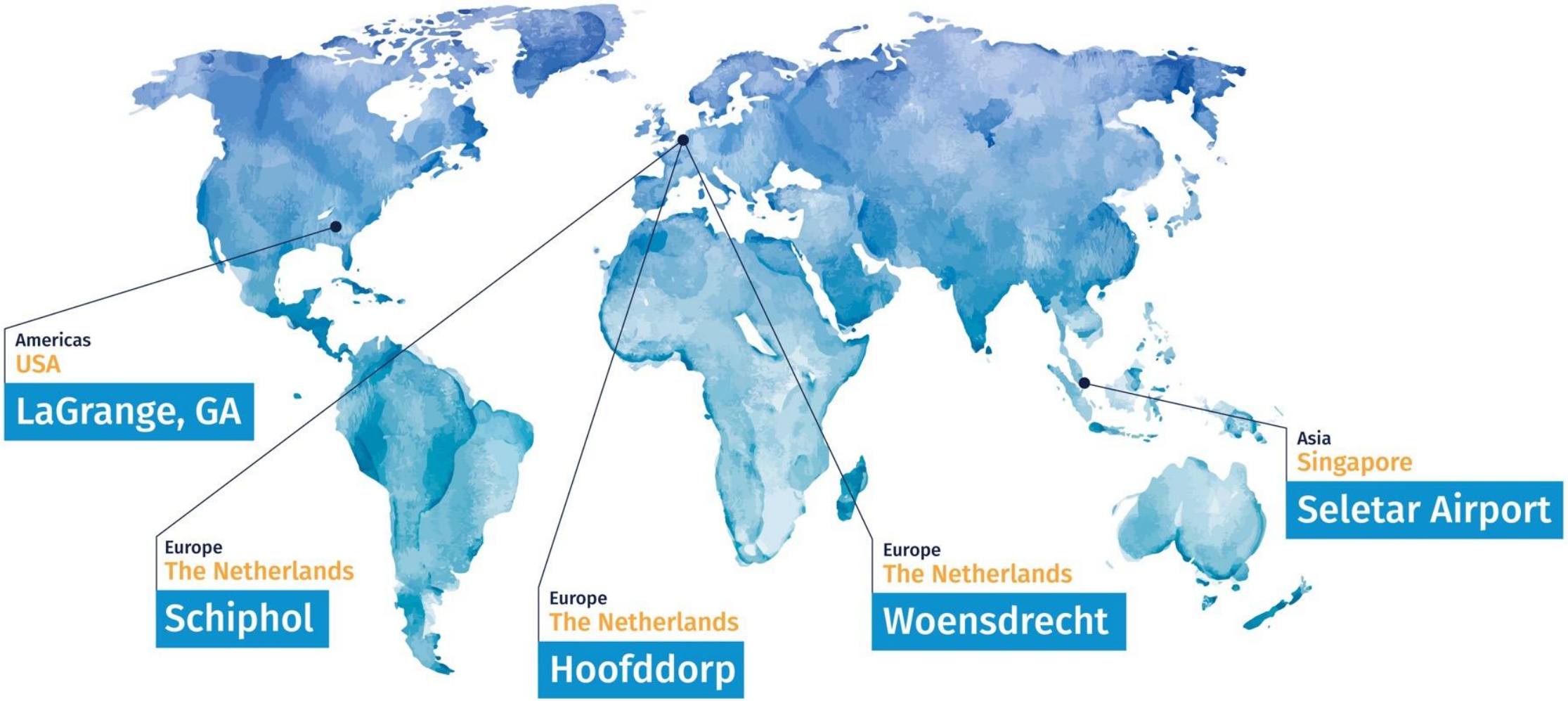
Component Services

Material Services



Modifications & Engineering Services

Global Reach



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AIRBUS	ATR	BOEING	DE HAVILLAND AIRCRAFT OF CANADA LIMITED	EMBRAER
A320 Family, A300/310, A330, A340, ACJ	42/72	737, 747, 757, 767, 777, 787, BBJ	Dash 8 Series	135/145, 170, 175, 190, 195

Fokker	Gulfstream	MITSUBISHI AIRCRAFT CORPORATION	LOCKHEED MARTIN	NH industries
50, 60, 70, 100, F27, F28	GV, 550	CRJ 200, 700, 900 & 1000	F-16	NH90

Approvals & Certifications

- Maintenance Organization approval (Part-145) for multiple authorities (FAA, EASA, UK, Aruba, Bermuda, CAAC China, CAAT Thailand, CASA Australia, Cayman, Guernsey, Indonesia, Mongolia, Myanmar, Papua New Guinea, Philippines, Saudi Arabia)
- Design Organization approval (DOA Part-21J)
- Continued Airworthiness Management Organization Approval (CAMO Part-M subpart G)
- Type Certificate (TC) Holder of all Fokker aircraft
- Supplemental Type Certificate (STC) Holder for multiple aircraft types and authorities ADS-B Out, CPDLC, EFB, LED, LPV, TCAS, SBAS, ULD
- Authorized Warranty Repair Station – Honeywell- Collins Aerospace-Gables

नागर विमानन महानिदेशालय
DIRECTORATE GENERAL OF CIVIL AVIATION

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Supplement Type Certification (STC)

Introduction

- **Major change**
  - STC procedure involving approval through the applicable authority (EASA/ FAA);
  - Applies when Aircraft Flight Manual is affected
  - Applies when primary aircraft structure is affected
  - **NO** approval or involvement required from Airbus or Boeing

- **Minor change**
  - **NO** STC procedure involving and can be released under own DOA part 21
  - Many bilateral agreements between international authorities automatically accepting each others minor changes
  - For EASA approved minor changes a bilateral agreement is in place between DGCA and EASA

“SBAS compliance per GAGAN is a MAJOR change”

SBAS (GAGAN) LANDING SYSTEM (LPV)

SBAS Architecture & Installation

- The unique modification adds the following main components to your aircraft:
- NEW TSO-C145e GPS/SBAS receivers
- TSO C190 GPS/SBAS antennas
- MIL qualified GPS Antenna Splitter
- NEW TSO-C36e (ILS), TSO-C40c (VOR), TSO-C66c (DME), TSO-C161 (GBAS) Navigation Control Panels
- NEW Annunciators for display of SLS Source, SLS Loss of Function and SLS Loss of Integrity
- NEW Wiring, bracketry, *circuit breakers*, *relays, logic modules* and more
- GLSSU suitable for interface with FMS and ATC and other GPS user systems, like CPDLC, EGPWS, CLOCK, etc.
- Installation Engineering Bulletin in one layout with clear instructions. Relevant maintenance and operational manual supplements will also be provided
- EASA, FAA and DGCA India approved solution. Other airworthiness authority certifications can be acquired as needed.

GPS/SBAS Receiver

Multi-Mode Navigation Control Panel

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Fokker Services and STC's

Fokker Services is:

- An independent DOA Part 21 STC provider
- Supporting many different aircraft types
- Raised EB's for Minor and Major changes for more then 4000 Airbus and Boeing aircraft
- Long track record in foreign STC validation;
  - Canada,
  - Bermuda
  - Ukraine
  - Vietnam
  - USA
  - Saudi Arabia
  - United Arab Emirates
  - Bahamas
  - Argentina
  - Brazil
  - Egypt
  - Russia
  - India
  - and many more

Fokker Services SBAS STC Solution

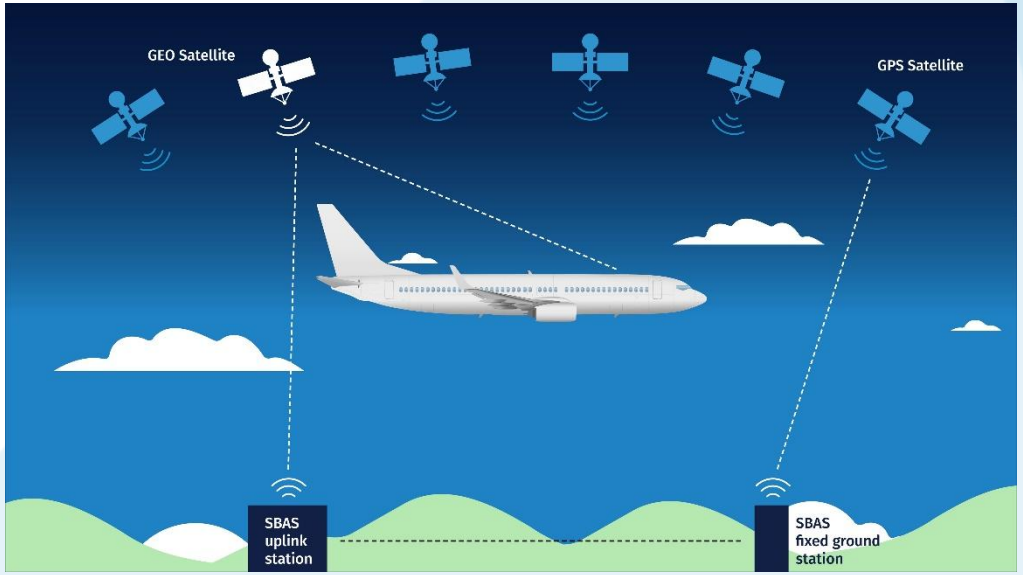
- STC is a by the EASA-DGCA-FAA approved procedure for retrofitting aircraft with modifications
- By airlines and lessors well accepted way to avoid via OEM required replacement of expensive hardware
- Stand- alone system philosophy, current system and its hardware can remain
- With other words, current MMR's can remain installed !
- **No additional structure substantiation required for installation of the GPS antennas.**


EASA

SUPPLEMENTAL TYPE CERTIFICATE

FOKKER SERVICES B.V.

- STC is proven to be up to 50% less then the OEM solution
- Hardware necessary for STC solution is available
- All manual supplements are available in an aircraft OEM layout
- Fully meeting the DGCA SBAS GAGAN requirements!



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» *"I am very enthusiastic about the Fokker Services LPV system and its ease of use. The 'ILS look-a-like' interface concept is not just a name or a marketing concept, it is a fact. With the Fokker Services LPV system, it is as easy to fly an LPV approach as an ILS approach. This similarity will reduce the crew training costs for the LPV approaches that will become the standard in the coming years."*
Philippe Porte, B737NG Technical Pilot at ASL France

SBAS (GAGAN) LANDING SYSTEM (LPV)

Supplemental Type Certificate

EASA
European Union Aviation Safety Agency

SUPPLEMENTAL TYPE CERTIFICATE

10079450

This Certificate/Approval is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 129 of that Regulation and in accordance with Commission Regulation (EU) No. 748/2012 to

FOKKER SERVICES B.V.

HOEKSTEEN 40
2132 MS HOOFDDORP
NETHERLANDS

EASA.21J.059

and certifies that the change in the type design for the product listed below with the limitations and conditions specified meets the applicable Type Certification Basis and, if applicable, environmental protection requirements when operated within the conditions and limitations specified below:

Type Certificate Number: EASA.IM.A.120
Type Certificate Holder: THE BOEING COMPANY
Type: 737
Model: 737-700
737-800
737-900
737-900ER

Description of Design Change:
B737-NG SBAS Landing System
Introduction of dual independent SBAS Landing System on aircraft with a CMA-5024 p/n 100 GLSSU sensor installed per Fokker Services CPR/CRR-0425 (EASA STC 10074404).

EASA Certification Basis:
The Certification Basis for the original product as amended by the following additional or alt airworthiness requirements:
the following paragraph(s) at a later amendment:
issue 2 of the following CS ACNS requirements: CS ACNS.C.PBN.275, CS ACNS.C.PBN.280, CS CS ACNS.C.PBN.310, CS ACNS.C.PBN.320, CS ACNS.C.PBN.325, CS ACNS.C.PBN.330, CS ACNS

See Continuation Sheet(s)

For the European Union Aviation Safety Agency

Cologne, Germany, 09 June 2022

Nicolas [illegible]
Project Certification Ma

Task Number: 60076142
FOKKER SERVICES B.V. - 301790

An Agency of the European Union TE.CERT.00091-005 © European Union Aviation Safety Agency. All rights reserved. ISO9001 Certif

The SBAS Landing System (SLS) complies with CS-ACNS issue 2 and AC 20-138D change 2 for RNP APCH navigation during final approach operation using GPS/SBAS (within the coverage of a satellite-based augmentation system complying with ICAO Annex 10) for GPS/SBAS based instrument approach procedures including instrument approach procedures with:
- "RNAV(GNSS)" or "RNP" in the title to "LP" minimums.
- "RNAV(GNSS)" or "RNP" in the title to "LPV" minimums.

The airplane is approved for the following types of RNAV(GNSS) or RNP instrument approaches using SLS guidance:

- *MDA/H 250 feet or more (LP minimums)*
- *DA/H 200 feet or more (LPV minimums)*
  - *Manual approach with or without flight director.*
  - *Single channel automatic approach and manual landing.*

United States of America
Department of Transportation
Federal Aviation Administration

Supplemental Type Certificate

IMPORT

Number: ST00090IB

This certificate issued to: Fokker Services B.V.
Hoeksteen 40
Netherlands

Certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 25 of Title 14 Code of Federal Regulations.

Original Product Type Certificate Number: A16WE

Make: The Boeing Company

Model: 737-700, -800, -900, 900ER

Description of Type Design Change:
Installation of dual independent SBAS Landing System on aircraft with a CMA-5024 p/n 100-601967-150 in accordance with Master Document List, MDL-0435, Issue 1, dated August 07, 2022 or later EASA approved revision; maintained in accordance with B737-HAMVS-ICA-S-002, Issue 1, dated March 18, 2022, or later EASA accepted revision; and operated in accordance with AFMS B757-SLS-AFM-S-001, Issue 3, dated November 01, 2020 or later EASA approved revision.

*Next: SLS (LPV) roll-out to **B737MAX** (with minor changes).*
Other aircraft platforms on-request.

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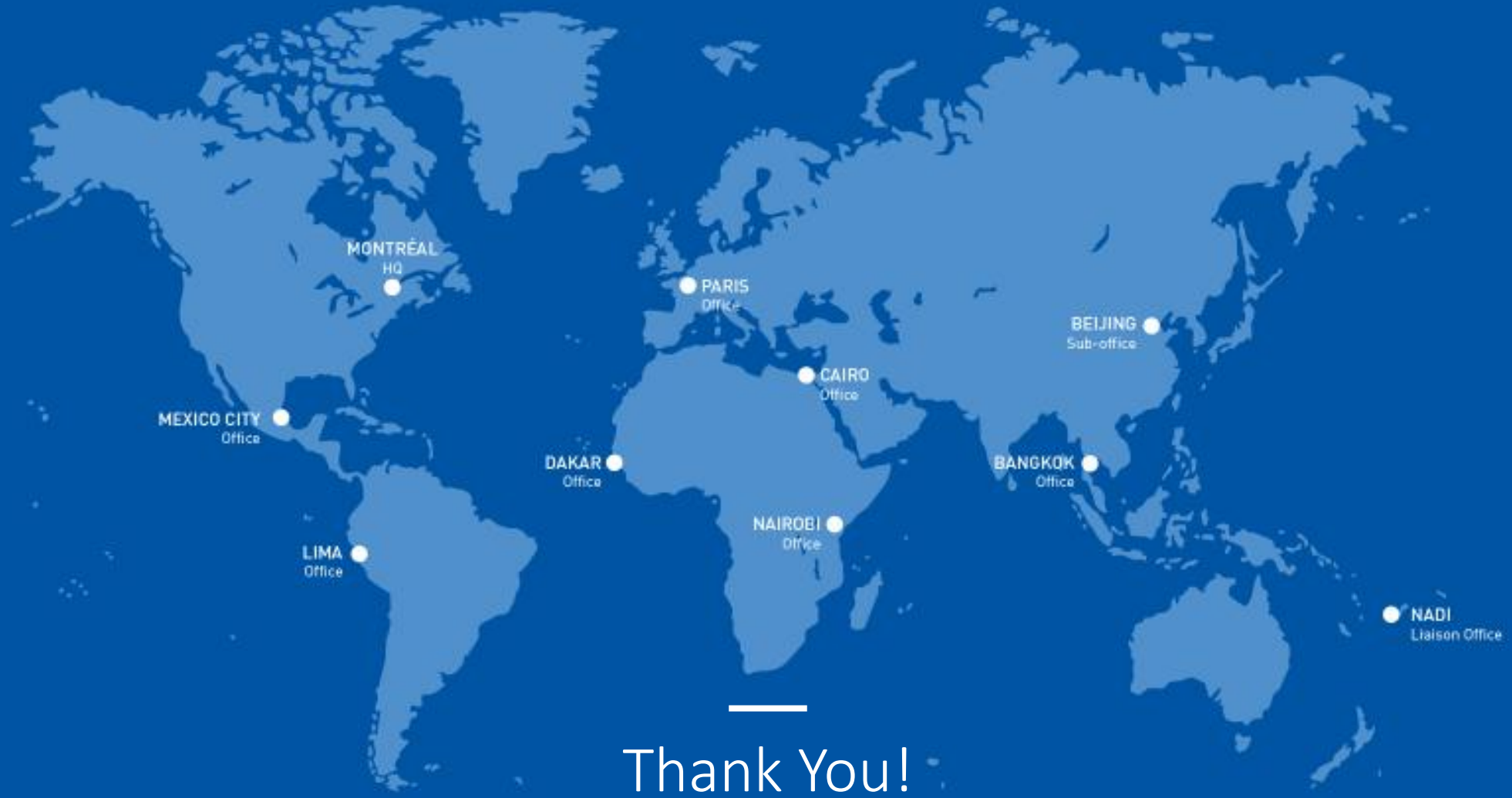

Thank You!

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