

Production Approval System in Japan and Recent Developments

2015 Global Manufacturing Meeting

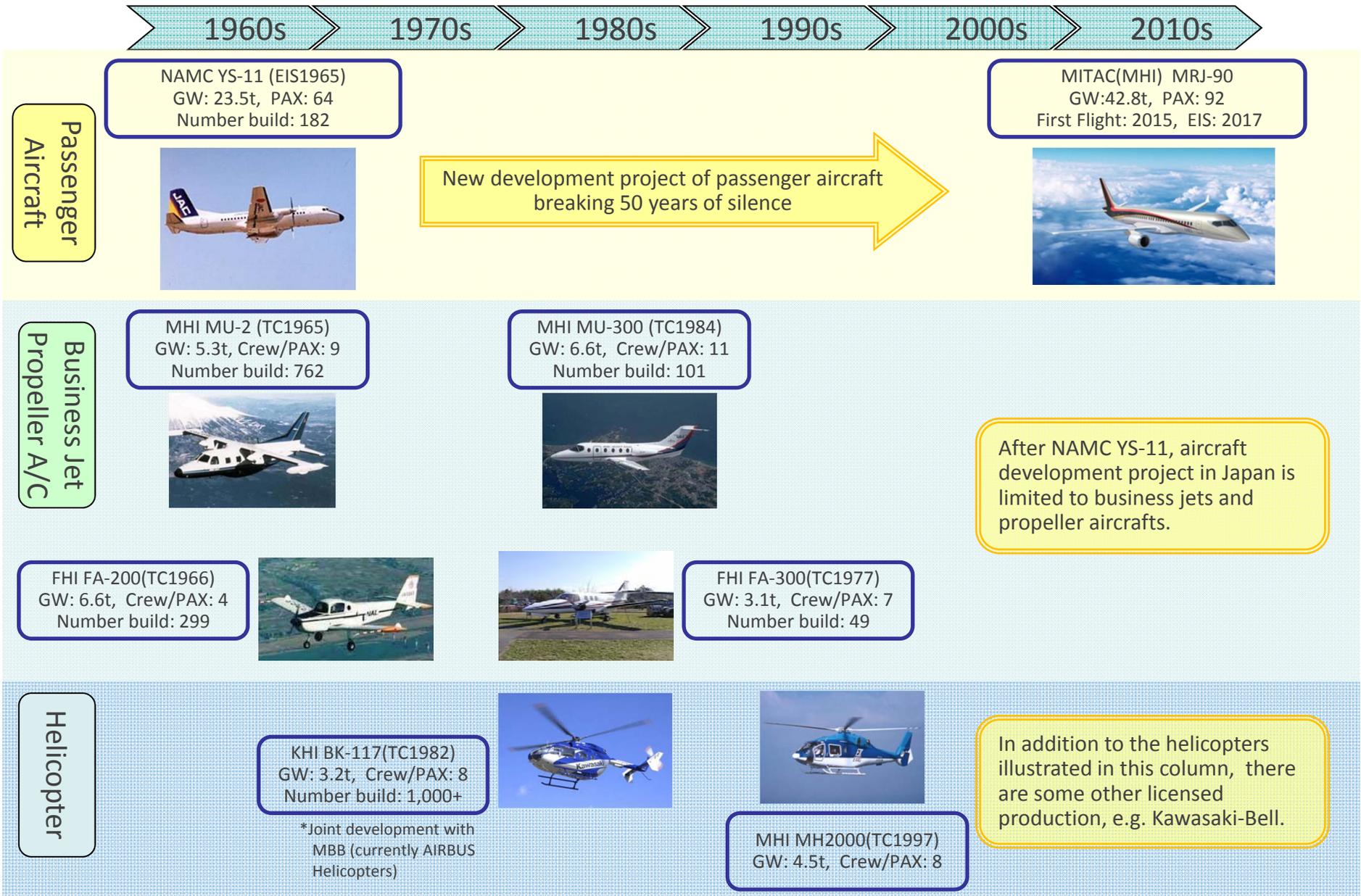
Arlington, Virginia

1-3 September 2015

Daisuke Umezawa

Director, Airworthiness Standards and International Affairs Office
Japan Civil Aviation Bureau (JCAB)

1. Brief history of civil aircraft developments



2. Recent civil aircraft/ engine manufacturing

- In prewar days, over a million people worked for aircraft manufacture at its peak. (Population of Japan at that time was around 72million.)
- Research, design and manufacture of aircraft were completely prohibited for seven years (1945-52) after the War.
- During the last couple of decades, Japanese manufacturers have focused on the international joint projects, and steadily gained its work share in those projects.

✓ Boeing (as program partners(PP))

B767 (work share 15%), B777 (w/s21%), B787 (w/s35%)
: MHI, KHI, FHI, NIPPI(except787), ShinMaywa

✓ AIRBUS (as suppliers)

A300, 310, 320, 330, 340: Joined as suppliers
A380: MHI, FHI, ShinMaywa

✓ IAE (International Aero Engines) (as PPs)

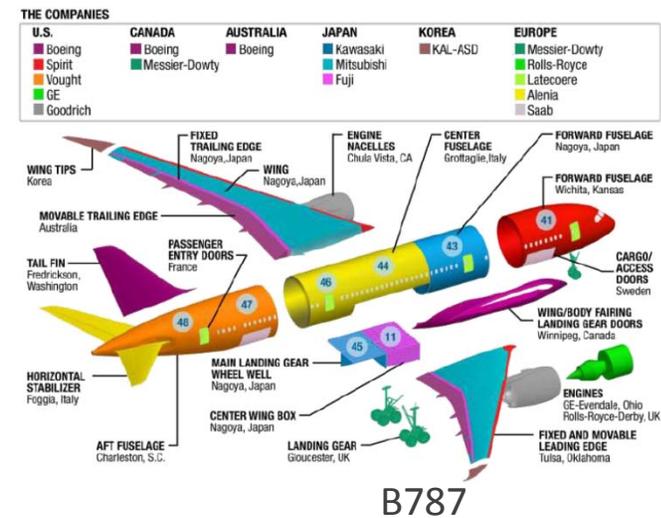
V2500(w/s23%): IHI, KHI, MHI

✓ GE (as Risk Revenue Sharing Partners(RSP))

CF34(w/s30%): IHI, KHI GE90(w/s10%): IHI

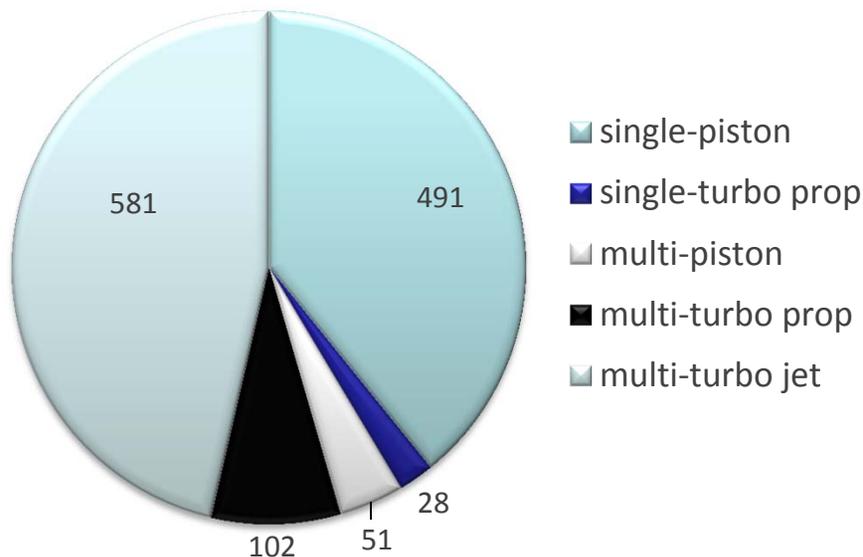
✓ Rolls-Royce (as RSP) Trent 1000(w/s16%), Trent XWB(w/s14%): IHI, KHI

✓ Pratt & Whitney PW4000(RSP w/s10%): KHI, MHI, PW1100G-JM(PP w/s14%): KHI, MHI



3. Aviation activity

- The number of Japan-registered aircrafts (as of January 2015);
Airplane: 1,253, Helicopter: 809, Airship:1, Glider: 661 (TTL 2,724)
- Almost all the 581 multi-engine turbojets are operated by Japanese air carriers for passenger service flights.
- Japan is ranked at seventh-place in the world in terms of total revenue tonne-kilometers (RTK) for 2014.



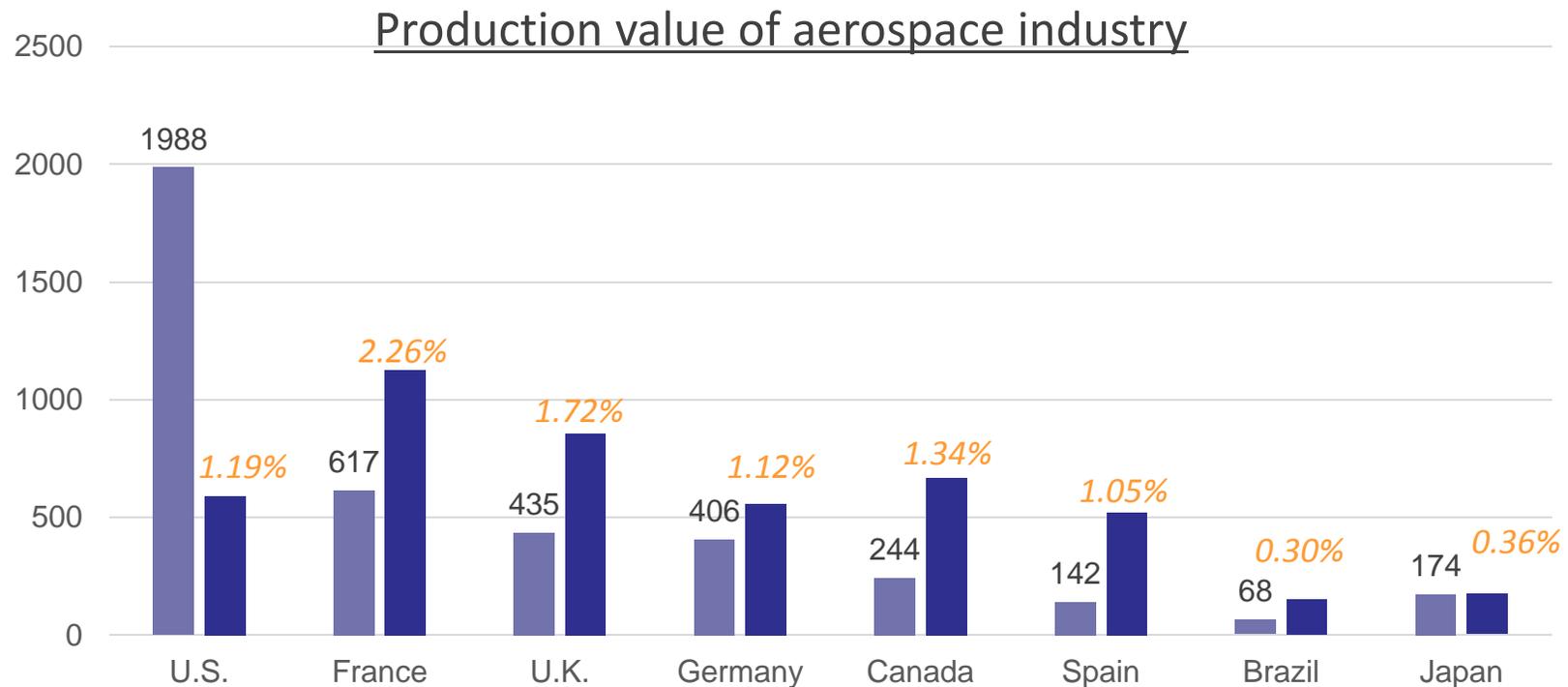
The composition of Japan-registered airplanes

Country	RTK (in million)
U.S.	165,662
China	74,434
United Arab Emirates	46,893
United Kingdom	30,887
Germany	29,820
France	22,211
Japan	22,068

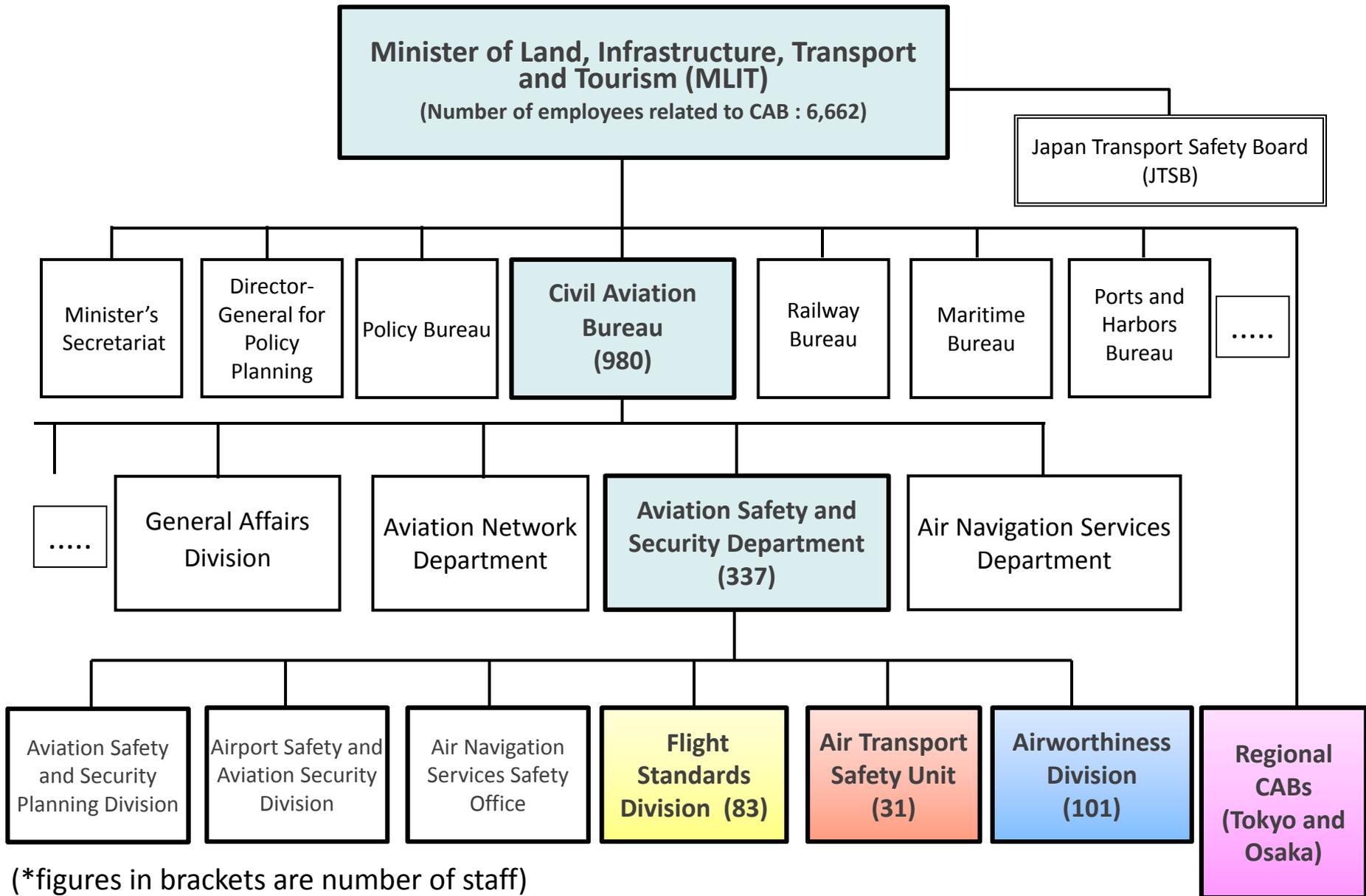
(Source: ICAO Council Annual Report 2014)

4. Aerospace industry size

- Aerospace industry size of Japan as of today is relatively small in terms of the percentage against GDP, and has unfulfilled growth potential.
- The production value of aerospace industry in Japan for 2013 is;
 - \$17,400M, which corresponds to 0.36% against Japanese GDP.
 - 8.8% of the U.S., or 10.9% of the total of France, Germany, Spain and the UK in production value.
 - almost 1/5 of the preceding countries in the percentage against DGP.

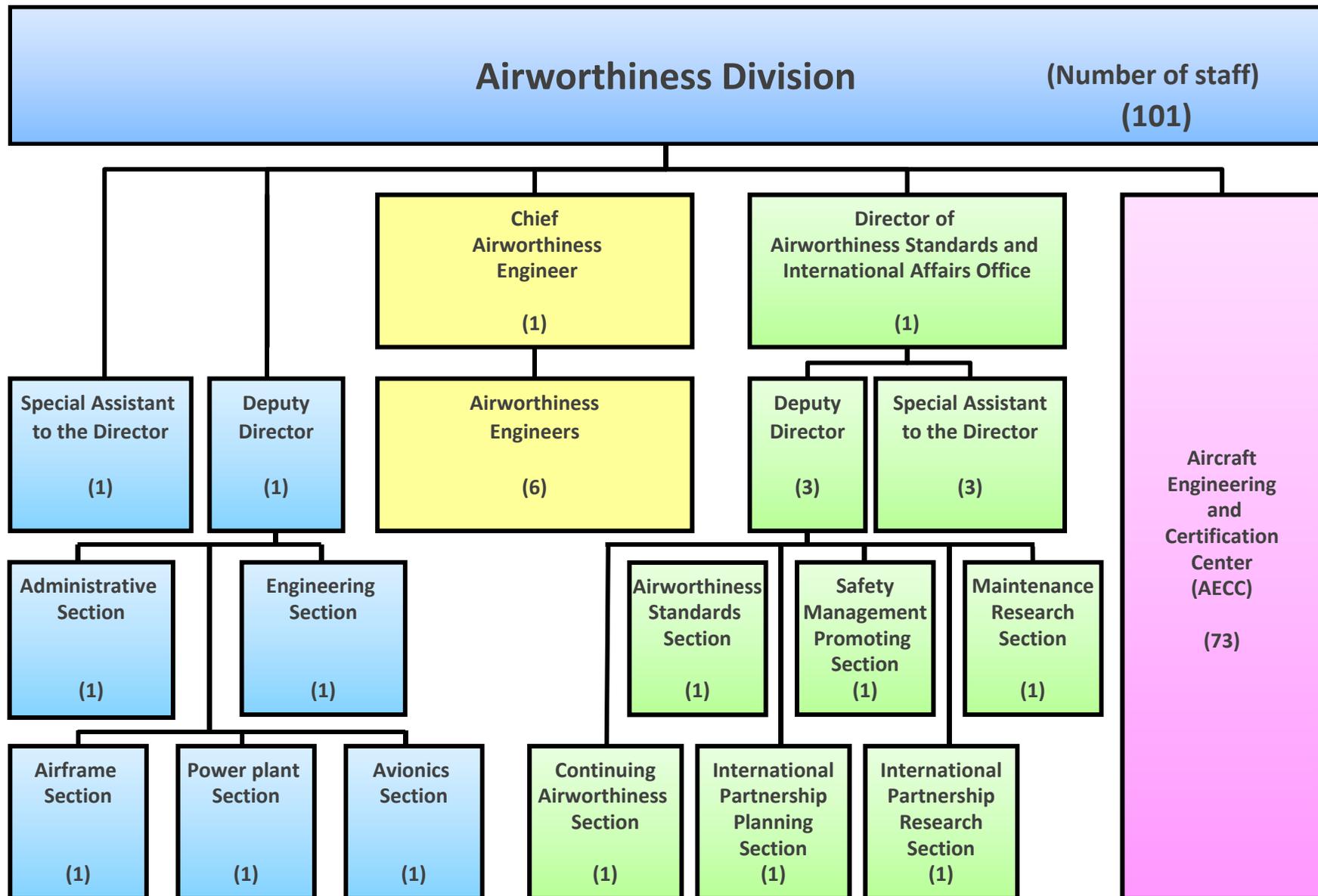


5-1. Organization of JCAB

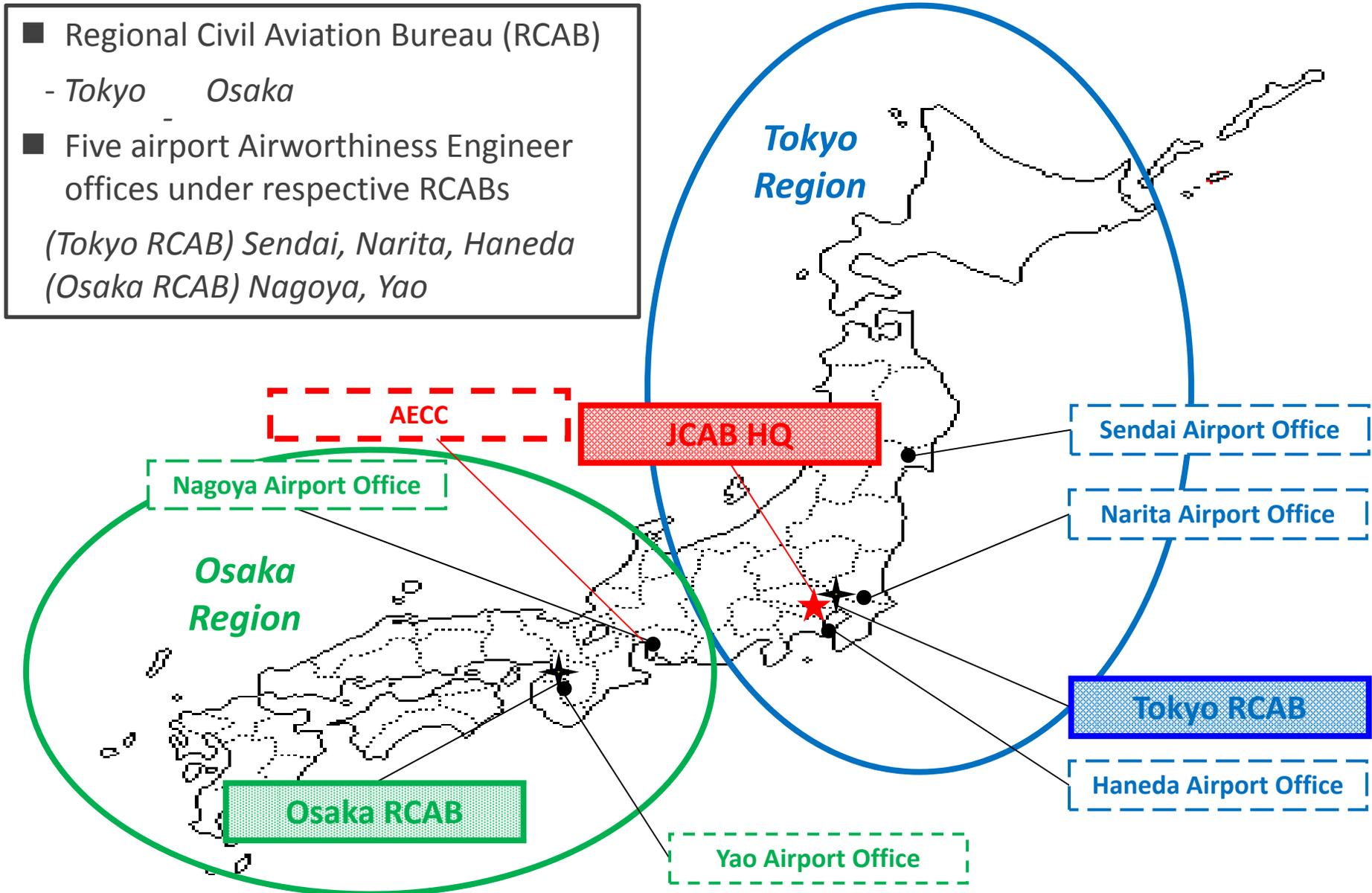


(*figures in brackets are number of staff)

5-2. Organization of JCAB

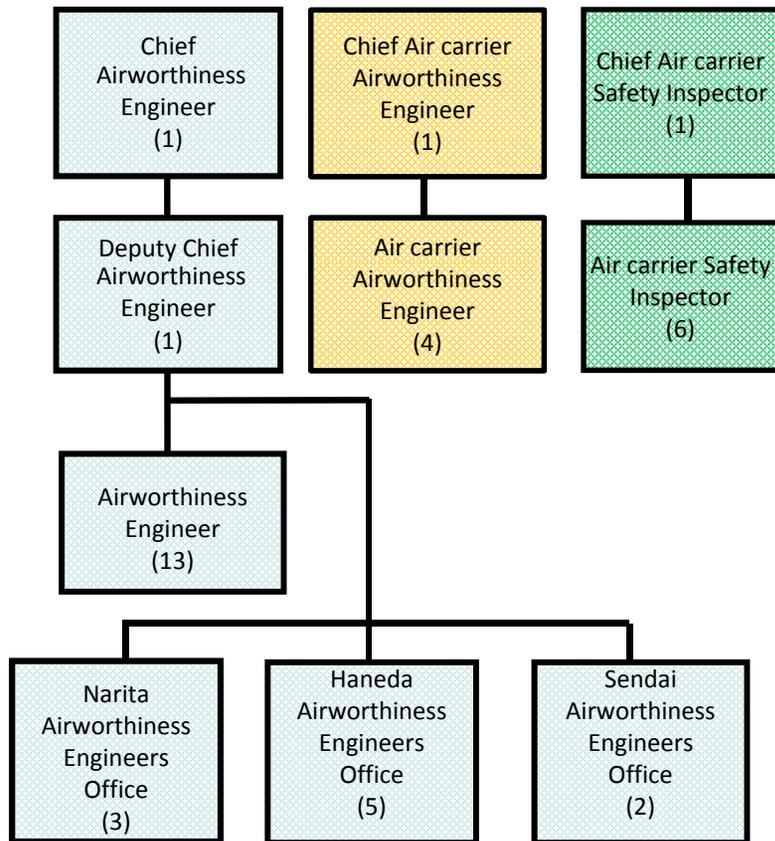


6. Jurisdiction of Regional CABs (Tokyo, Osaka)

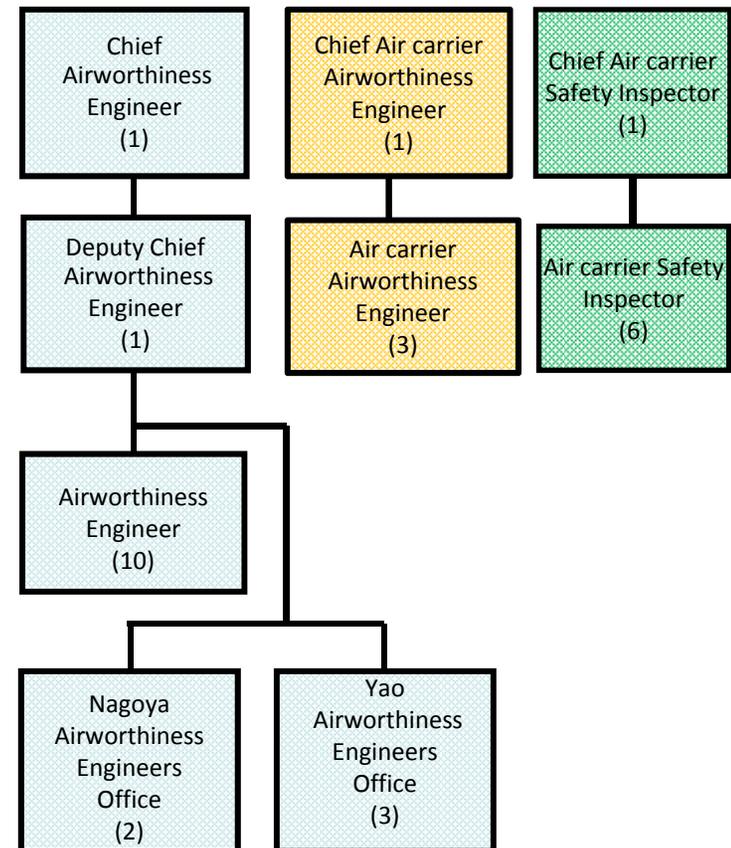


7. Organization of Regional CABs (Tokyo and Osaka)

Tokyo Regional CAB



Osaka Regional CAB



(*figures in brackets are number of staff)

8. Responsibilities of JCAB HQs and RCABs

	JCAB Headquarters Airworthiness Division (including AECC)	Regional Offices (Tokyo, Osaka, Airport offices)
Certification System (CAL, CAR, Circulars, and other regulations)	○	-
International affairs (ICAO, Foreign CAAs)	○	-
Airworthiness Directives	○	-
Type Certification(TC)/ TC Change/ Supplemental TC	○	-
Airworthiness Certification	○ (Inspection and certification in foreign country)	○ (Inspection and certification in each region)
Organization Approval (Initial Approval)	○	-
Organization Approval (Renewal, Expansion of limitation)	○ (Inspection in foreign country)	○ (Inspection in each region)

	CAB Headquarter Air Transport Safety Unit	Regional Offices (Tokyo, Osaka)
Surveillance of air carrier maintenance - Maintenance system - Approval of maintenance manual - Safety confirmation inspection	○(*1)	○(*2)

*1 Air carriers operating aircrafts with seats more than 100 or maximum take off weight over 50 tons.

*2 Air carriers not included in the category *1

9-1. Approved organizations -Capabilities (CAL Art.20)-

- There are seven (7) capabilities of JCAB approved organization, four (4) are for aircraft and three (3) are for components/parts.
- Each approved organization is granted one or more capabilities.

Aircraft



1. Aircraft Design and Inspection **ADO for Aircraft**
-The capability to design aircraft and conduct the inspection
2. **Aircraft Production and Inspection** **APO for Aircraft**
-The capability to manufacture aircraft and conduct the inspection
3. Aircraft Maintenance and Inspection **AMIO for Aircraft**
-The capability to perform maintenance and inspect an aircraft after maintenance for the renewal of airworthiness certification
4. Aircraft Maintenance or Alteration **AMO for Aircraft**
-The capability to perform maintenance or alteration of aircraft

Aircraft Components/ Parts



5. Parts Design and Inspection **ADO for Aircraft parts**
-The capability to design components/parts and conduct the inspection
6. **Parts Production and Inspection** **APO for Aircraft parts**
-The capability to manufacture components/parts and conduct the inspection
7. Parts Repair or Alteration **AMO for Aircraft parts**
-The capability to perform repair or alteration of components/parts



1. Facilities

(Equipments, Work area, Storage etc.)



2. Organizations

(Responsibilities and Authorities)



3. Personnel

(Training, Qualification for capable staff, Appropriate number of employees)



4. Certifying Staffs

(Qualification, Experience, Knowledge of JCAB regulations and Quality Control System etc.)



5. Method of Work

(Adequately documented and maintained procedures, Policy for appropriate methods of work)



6. Quality System



Maintenance of Facilities

Control of materials, parts and components

Education and Training

Inspection system

Internal Audit

Revision Control of Method of Execution

Subcontractors Control



Control of Technical Documents

Record Control



7. Method of Certification

Ground/Flight Test of Aircraft

Function Test of Components

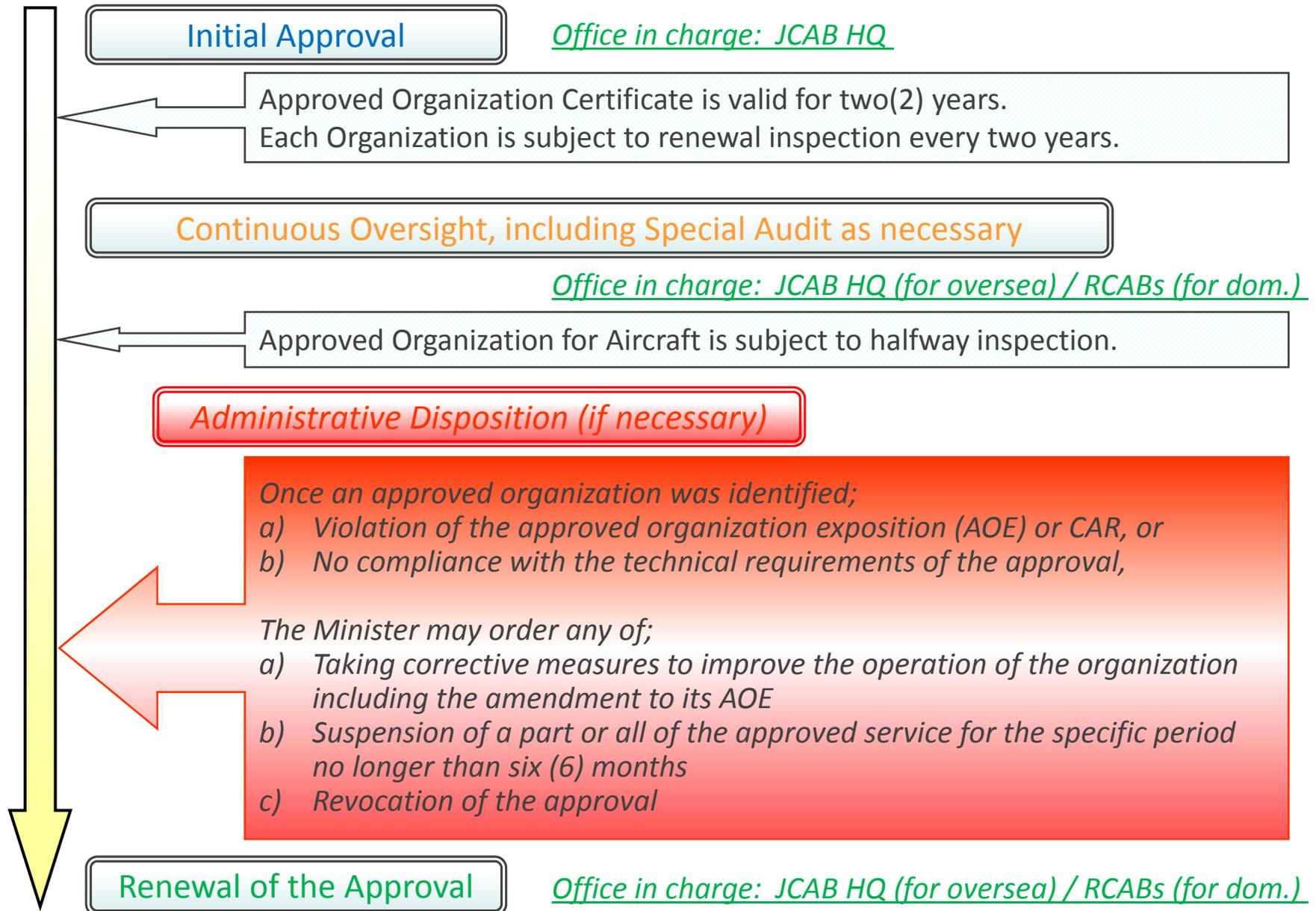
8. Safety Management System

Operation Policy

Management System

Method of Management

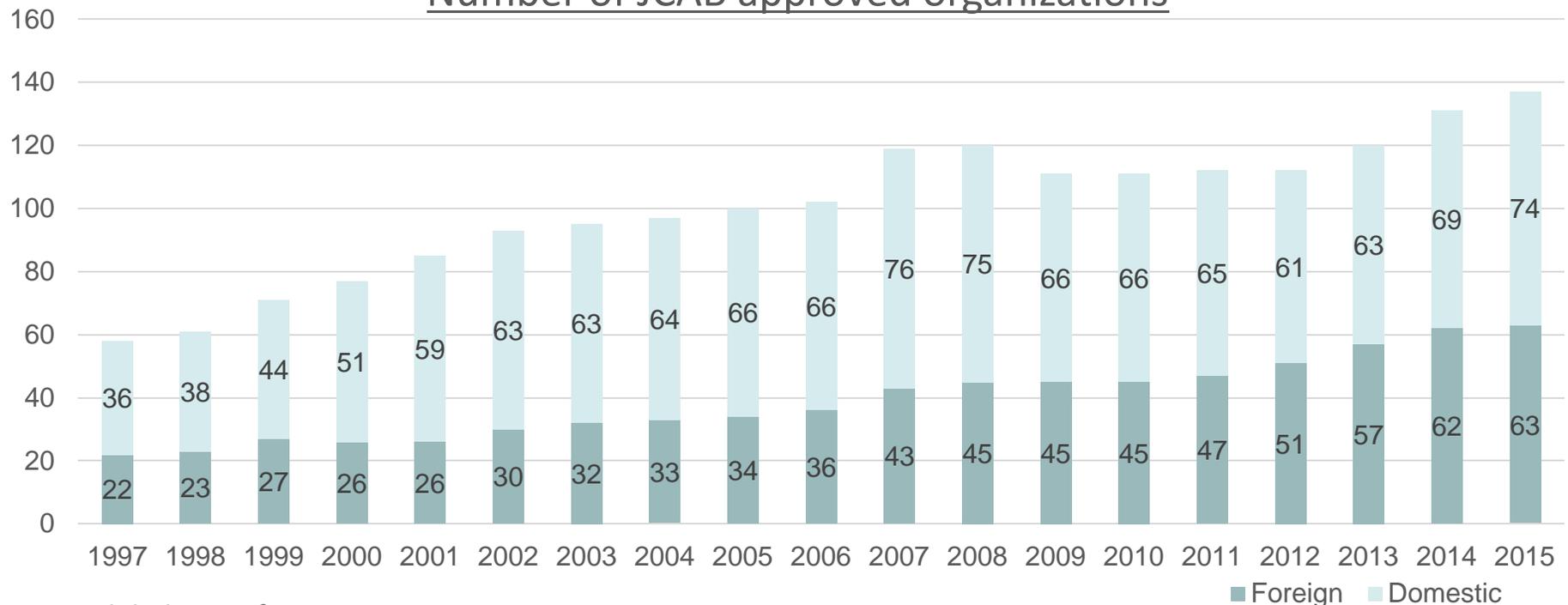
9-3. Approved organizations -Approval and Oversight-



10. Number of JCAB approved organizations

- JCAB has granted 137 approved organization, and 63 of them are foreign organizations (as of April 2015).
- ✓ The foreign countries where JCAB approved organizations locate are; US(14), Singapore(18), China (9), and so on.
- 19 of Japanese approved organizations have been granted the capability of manufacture (aircraft, component/part), while no foreign organization is approved as production organization.

Number of JCAB approved organizations



11. Approved Production Organizations

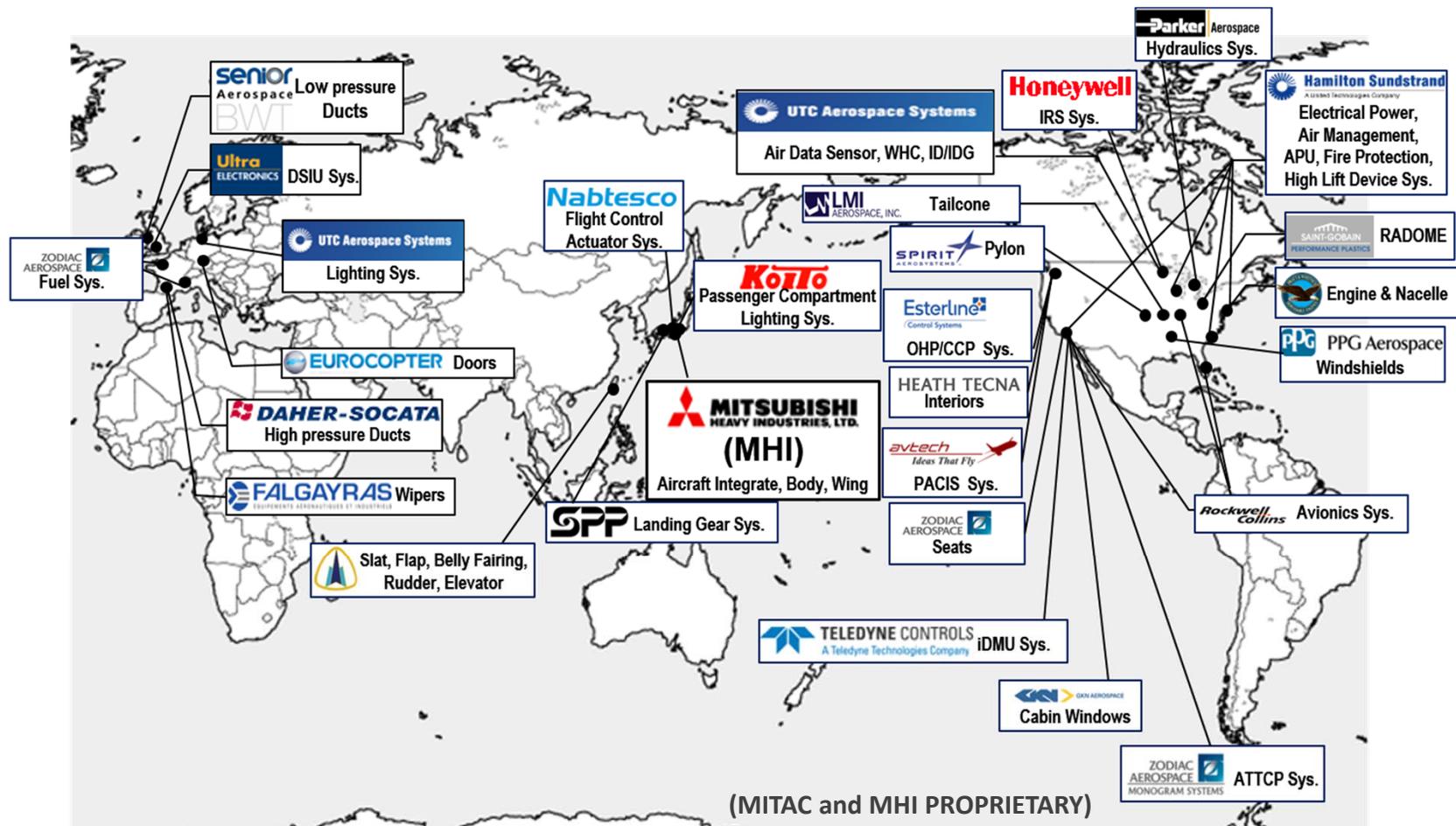
Some Japanese approved production organizations have supplier contracts with the Boeing, Airbus, etc., but the products being supplied to them are not necessarily covered by the JCAB approval. Furthermore, some suppliers have no JCAB production organization approval and are only under supplier control of those aircraft manufacturers.

<i>JCAB Approved Production Organization</i>	<i>Approved Products</i>
Kawasaki Heavy Industries (KHI)	BK117, Turbine engine, Transmission, Oil tank
Tokyo Aircraft Instrument (TKK)	Instrument(Mechanical, Electric), Pitot tube
Sumitomo Precision Products (SPP)	Oil cooler
SINFONIA TECHNOLOGY	Starter, Generator, Actuator
Nabtesco	Oil pump
Tamagawa Seiki	Gyro instrument
YOKOGAWA Electric	Electric instrument
JAMCO	Galley, Coat closet, Stowage
Bridgestone	Tire
KI HOLDINGS	Seat
Navicom Aviation	Electronic accessory
TOYOTA BOSHOKU	Seat

* Aiming at the TC of MRJ scheduled in 2017, MHI has already made an application and some other applications are expected.

12. Supplier dispersion around the globe

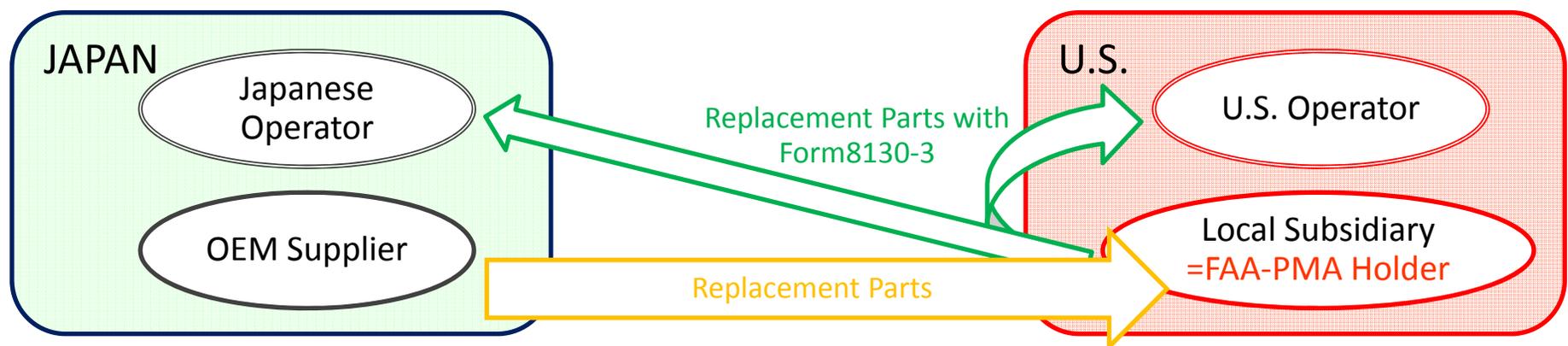
- The components/parts suppliers of MRJ disperse around the globe.
- The globalization of aircraft manufacturing brings about an emerging difficulty for the CAAs of the State of Manufacture to fulfill its responsibility stipulated in ICAO Annex8.



13. Establishment of JCAB-PMA framework

[Problems highlighted]

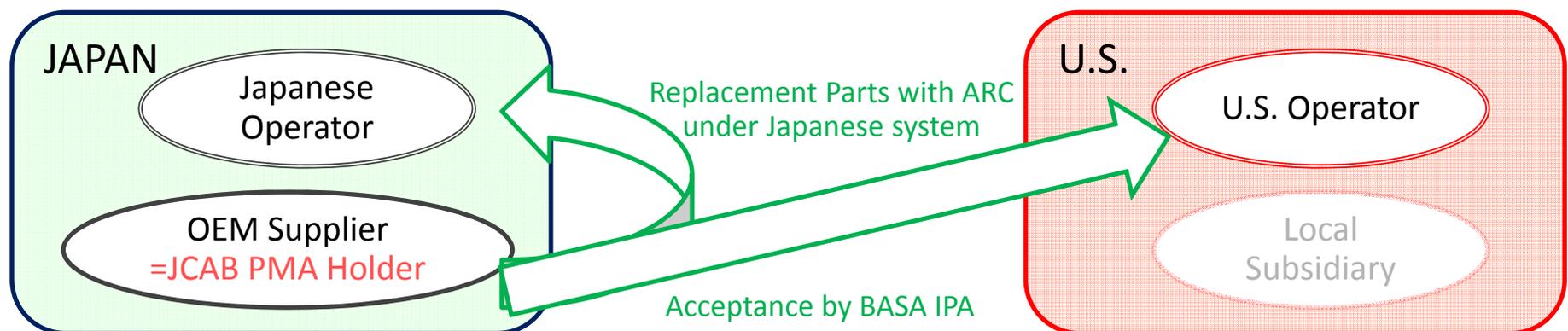
- Japanese OEM suppliers establishes local subsidiaries in the U.S. to receive FAA-PMA approval to ship their parts directly to their customers.
- Their main manufacturing facility locates in Japan, therefore the replacement parts are shipped to their factory in the U.S. and distributed to the U.S. operators.
- Some of these replacement parts are shipped back to Japan for Japanese operators, which brings unnecessary extra cost and time.
- It would be of value to invite those manufacturers to obtain JCAB production organization approval to ensure the quality of components/parts.



13. Establishment of JCAB-PMA framework

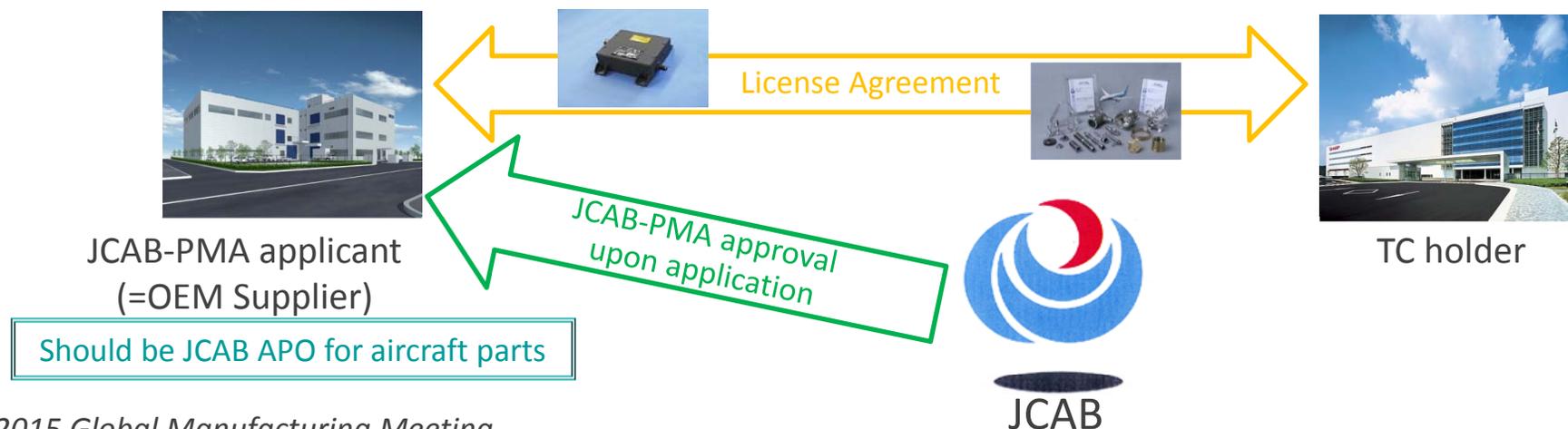
[Solution]

- Establish JCAB-PMA framework to allow OEM suppliers to obtain JCAB-PMA approval.
- These OEM suppliers have to obtain JCAB production approval to issue authorized release certificate (JCAB Form 18) under Japanese regulatory system.
- Japanese operators will be authorized to install JCAB-PMA parts for their Japan-registered aircrafts.
- Coordinate with the FAA and other CAAs as necessary to make JCAB-PMA with JCAB Form18 be accepted through BASA IPA or similar arrangements.



13. Establishment of JCAB-PMA _ Summary-

- JCAB has established JCAB-PMA framework in April this year.
- The design of JCAB-PMA parts shall be identical to the original parts included in the Type Certification (TC).
- The applicant (commonly an OEM supplier) should have a license agreement between TC holders to use the TC design data for JCAB-PMA. (*“Identity with License Agreement”*)
- The applicant should be certified as JCAB APO for aircraft parts for the production and the issuance of ARCs (JCAB Form18) for JCAB-PMA parts.
- The replacement parts should be properly marked, i.e. the name of manufacturer, P/N, S/N, the description of “JCAB-PMA”.
- BASA IPA between the FAA has been amended to include the acceptance of JCAB-PMA.



- Japanese manufacturers have focused on the international joint projects, and steadily gained its work share as suppliers. Aerospace industry size of Japan as of today is relatively small in terms of the percentage against GDP, and has unfulfilled growth potential.
- There are seven types of JCAB organization approval, two of which are for manufacturing (aircraft, components/parts). Every approved organization are subject to certification renewal inspection every two (2) years, and JCAB HQs and two RCABs share the approval/oversight responsibilities.
- To cope with the globalization of aircraft manufacturing, mutual cooperation among partner CAAs in conducting supplier audits under its jurisdiction, as a part of technical assistance, is crucial for each State of Manufacture (SoM) to fulfill its responsibility under its limited resources.
- The establishment of JCAB-PMA framework is primality aimed at realizing more efficient parts logistics, but it has a synergistic effect to invite the OEM suppliers to obtain JCAB production organization approval.