

Civil RPAS Regulation & Usage in JAPAN



Akira Sato

**Senior Manager, Engineering Division
UMS Business Development Section**

Yamaha Motor Co.,LTD  **YAMAHA**

**Director,
Japan UAV Association**



1. Introduction

2. Civil RPAS Regulation in Japan

**3. Civil RPAS Usage in Japan
(YAMAHA Unmanned Helicopter)**

4. Future Business Plan

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Introduction

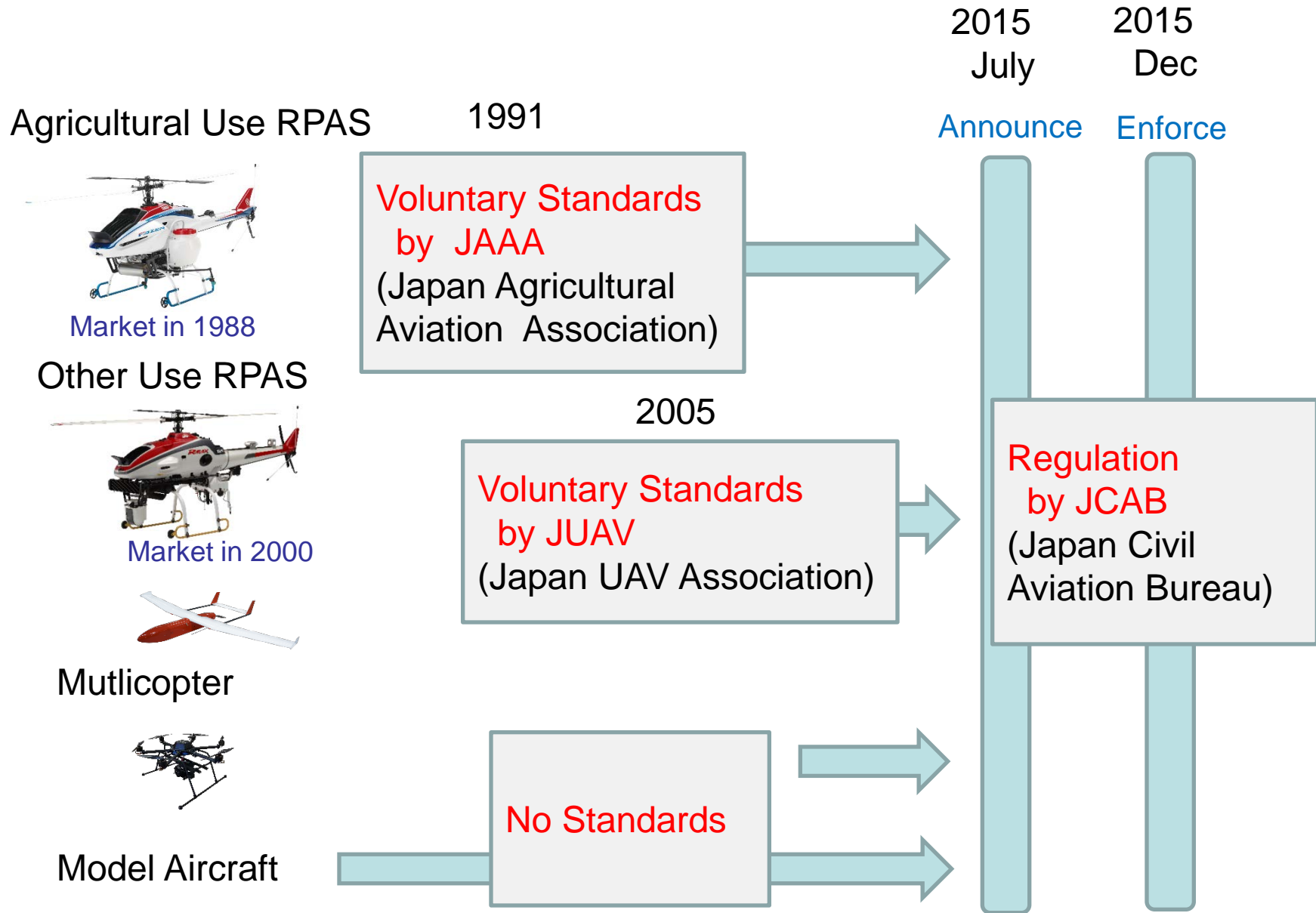


- ◆ On September 11 in 2015 Japanese government; JAPAN Civil Aviation Bureau(JCAB), announced to set up a regulation of civil RPAS for the first time.
- ◆ Beforehand there had been no RPAS regulation in Japan. Two civil organizations; Japan Agricultural Aviation Association(JAAA) and Japan UAV Association(JUAV), made voluntary standards and have operated RPAS for agricultural and disaster use safely.
- ◆ Right now 2,702 RPAS and 11,830 pilots are registered in both organizations.
- ◆ We introduce the new RPAS regulation and its background. We also introduce RPAS(Unmanned Helicopter) usage and future business plan by YAMAHA.

2. Civil RPAS Regulation in Japan

- History of RPAS Regulation**
- Voluntary Standards**
- Safety Standards of JUAV**
- Regulation by JCAB**

History of RPAS Regulation

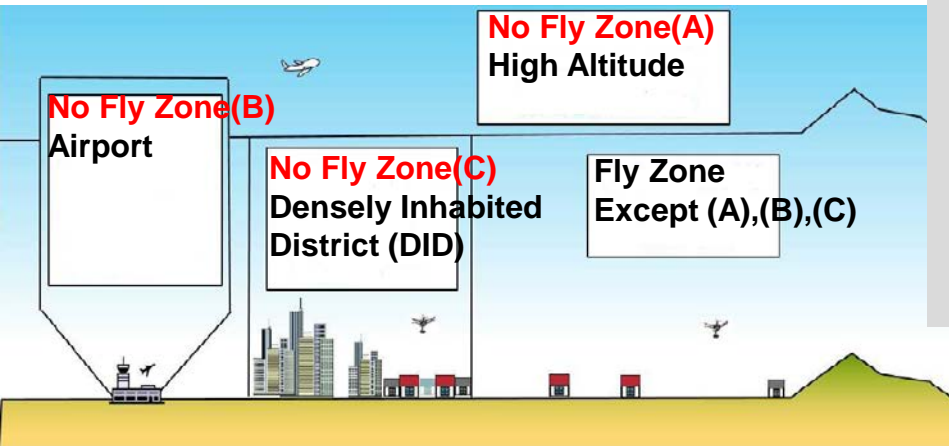


Voluntary Standards



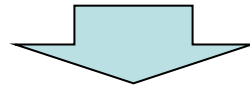
	Agricultural Use RPAS	Other Use RPAS
Responsibility Organization	Japan Agricultural Aviation Association(JAAA)	Japan UAV Association (JUAV)
Back ground	Ministry of Agriculture, Forestry and Fisheries	Japanese UAV Industry Companies
Type of RPAS	Rotary-wings	Rotary-wing, Fixed-wing, Small UAV
RPAS Registration	○	○
Safety Design	○(Safety Standards)	○(Safety Standards)
Pilot Certification	○	○
Operation	○	○
Maintenance	○(Annual Shop Inspection)	○(Annual Shop Inspection)
Destruction	○	○
Customer Control	○	○

(1) No Fly Zone



(2) Standard RPAS Operating Condition

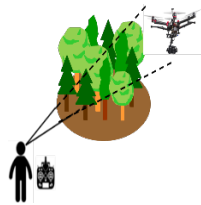
- During the time of sunrise to sunset
- Able to see the RPAS all the time
- Fly 30m away from people, buildings and cars.
- Not fly over people in events sites.
- Not transport or carry hazardous substance
- Not drop substance from the RPAS



If you fly out of this standard condition,
you need to get the permission from JCAB.



(in night)



(out of sight)



(within 30m)



(in events sites)



(hazardous substance)



(drop)

3. Civil RPAS Usage in Japan (YAMAHA Unmanned Helicopter)

- History of
YAMAHA Unmanned Helicopter**
- YAMAHA Unmanned Helicopter Lineup**
- Agriculture Use**
- Observation and Measurement Use**

History of YAMAHA Unmanned Helicopter



- 1982 Japanese Government asked YAMAHA to develop Unmanned Helicopter for Agricultural Use
- 1986 YAMAHA finished to develop **RCASS** (Co-Axial Rotor Type Unmanned Helicopter)
- 1990 **R-50** Released
- 1997 **RMAX** Released
YAMAHA started to develop Program Flight Unmanned Helicopter
- 1999 YAMAHA established a prototype model
- 2000 **Observation role at Mt.Usu**
- 2001 Program Flight RMAX G0 Released
- 2003 **RMAX Type IIG** Released
- 2006 Program Flight **RMAX G1** Released
- 2013 **FAZER** Released



RCASS (Co-Axial Rotor)



R50



RMAX



FAZER

YAMAHA Unmanned Helicopter Lineup



RMAX

Agricultural
Unmanned Helicopter



RMAX G-1

Program Flight Type
Unmanned Helicopter



FAZER

Agricultural
Unmanned Helicopter



Length

2.75 m

2.75 m

2.78 m

Weight

70 kg

84 kg

67 kg

Payload

24 kg

10 kg

33 kg

Flight Time

50 min

80 min

45 min

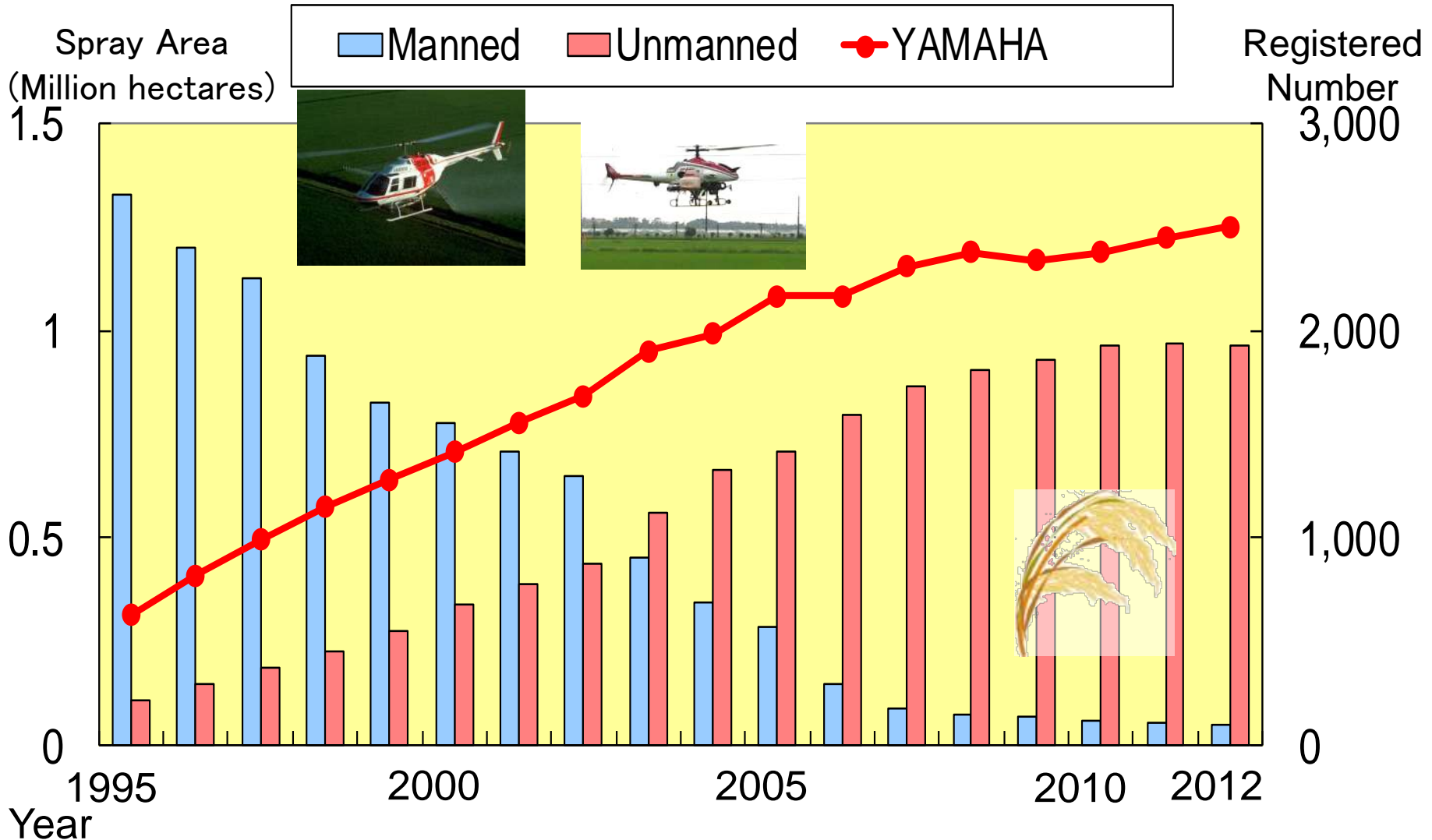
Speed Control

Cruise Support

Program Flight

Auto Cruise

Transition from Manned to Unmanned Helicopters



(According to the Japan Agricultural Aviation Association Report)

Spray Applications

Rice Paddies



Wheat



Soy Beans



Pine Trees



Vegetables



Fertilizer



Observation and Measurement Use



Volcano Observation

- Erupting Volcano, **Mt.Usu** (2000)
- Miyake-jima Island (2001)
- Installation of Earthquake Observation Module at **Skura Volcano** (The Earthquake Research Institute, Tokyo University 2009-)
- Mt. Mihara (2012)、Mt. Tarumae (2011)



Volcano **Mt.Usu**



Sakura Volcano

Enforcement

- **Security at Iraq** (Japanese Self Defense Force, 2004)

Remote Sensing

- **Environmental Remote Sensing** (Chiba University 1999-)
- Vegetation Survey (Rice...)、**Geographical Survey**



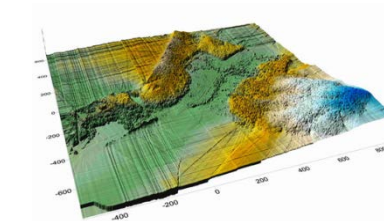
Security at Iraq

Radiation Monitoring

- Japan Nuclear Cycle Development Institute (2001-2003)
- Nuclear Safety Technology Center (2007-2012)
- **Radiation Monitoring** around Fukushima Nuclear Power Plant (2012-)



Radiation Monitoring



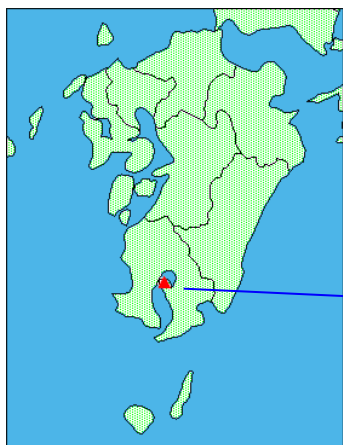
Geographical Survey



Environmental Remote Sensing

Insulation and recovery of EOM (Earthquake Observation Module)

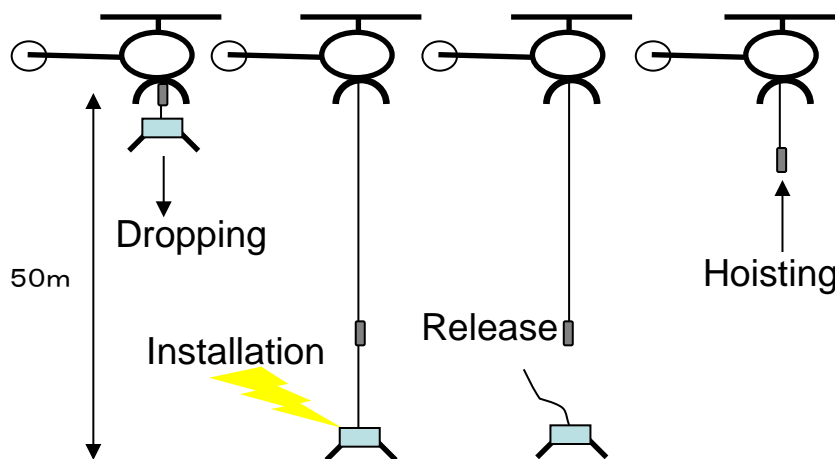
(The Earthquake Research Institute,
Tokyo University 2009-)



Restricted Area
(2 km radius from the crater)



Suspending winch



4. YAMAHA Future Business Plan

- Expanding RPAS Business
in the world**
- Business Strategy**

Expanding RPAS Business in the world



**Euro : In preparation/Vine Yard
/Laboratories 4 units('00~)**



**Japan : Rice · Wheat · Soy beans
2,688 units ('89~)**



**Korea : Rice
233 units ('03~)**



United States

May 2015

**FAA Grants Part 333Exemption
Laboratories 34units ('93~'05)
Ready to Start/Vine Yard
9 units ('12~)**



**Thailand :
Ready to Start/Rice · Corn
2 units ('13~)**

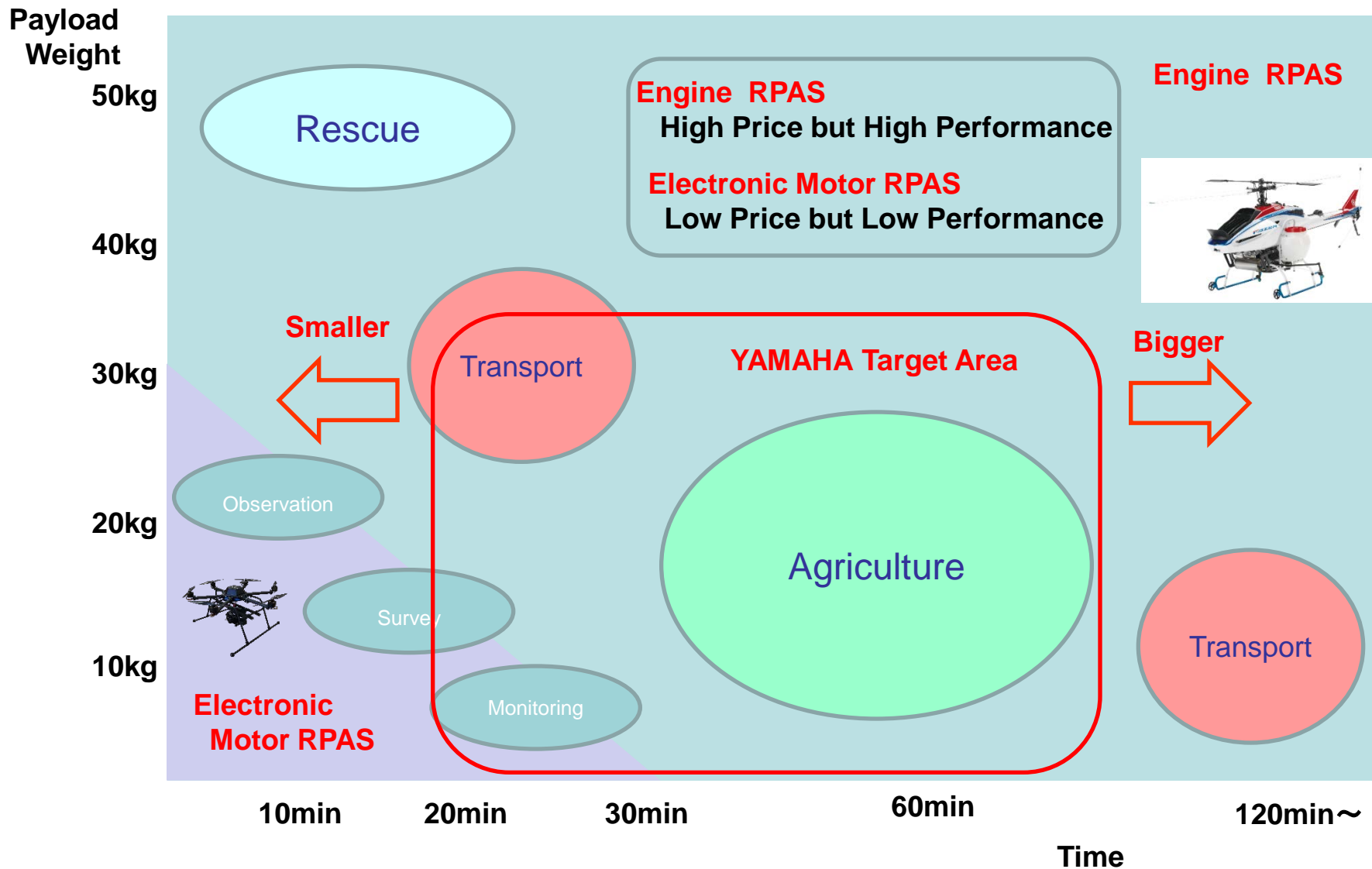


**NZ : Ready to Start
1unit ('15~)**



**Australia : Weeds Control · Mining
11units ('11~)**

RPAS Performance = Payload Weight × Time



4. Conclusion

Conclusion



- ◆ **More than 2600 RPAS are used for agricultural use in Japan.** JAAA have controlled them by its voluntary safety standards.
- ◆ Other RPAS are used for measurement and observation use in Japan, such as radiation monitoring, volcano observation and enforcement. JUAV have controlled them by its voluntary safety standards.
- ◆ **Japanese government ,JCAB changed “Aviation Law ” to apply RPAS on December 10 in 2015.**
JCAB respects the safety standards of JAAA and JUAV so that RPAS registered by JAAA and JUAV was easily to get the permission to fly.
- ◆ **YAMAHA is expanding RPAS business in the world.** YAMAHA is also expanding RPAS line up to bigger engine RPAS and smaller electric motor RPAS.