

Noise Control Measure at ITAMI

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ABSTRACT

We have implemented various noise countermeasures to achieve coexistence with the local communities at Osaka International Airport (ITAMI). ITAMI is an urban airport in the vicinity of the city area and has aircraft noise problem. Local residents used to request an injunction of flights at night and abandonment of ITAMI. By implementing various noise countermeasures, we currently live in harmony with the local communities as a highly convenient airport.

However, there are still various strict operational restrictions and it is difficult to activate ITAMI. We have tried to deregulate one of these restrictions such as usable aircraft type and airlines. To get understanding of local residents and local communities, we have taken various countermeasures to reduce total noise volume and to prevent noise concentration on particular area.

In this paper, we will describe the history of ITAMI, noise countermeasures implemented so far, and current initiatives as a new attempt.

Keywords: Noise, Control, Airport

I-INCE Classification of Subject Number: 30

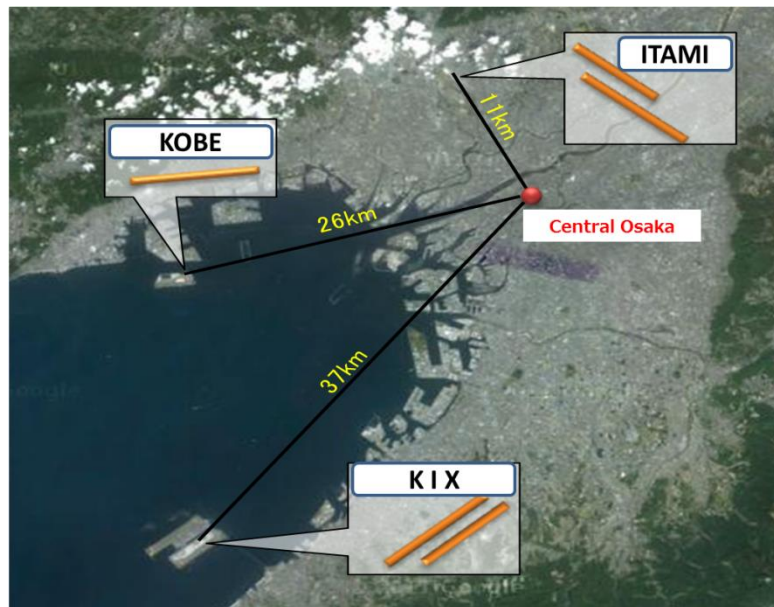
1. INTRODUCTION

The Kansai region of Japan has multiple tourist destinations including Kyoto, Nara, Osaka, and Hyogo, with a combined population of 20.33 million people, the world's eighth most populous area (United Nations, "The World's Cities in 2016: Data Booklet"). In this region, Kansai Airports (KAP) operates three airports, Osaka International

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Airport (ITAMI), Kansai International Airport (KIX), and Kobe Airport (KOBE). (Fig. 1)



(Fig.1) Location of 3 Airports in Kansai

ITAMI is conveniently located in an urban area approximately 11 km away from Osaka City, with about 15 million people living in the zone of accessibility within one hour from the airport. With the aim of mitigating the noise-related problems of ITAMI, KIX was constructed on an artificial island in Osaka Bay 5 km off the coastline in 1994. KOBE is an offshore airport built as a gateway to the sky in Hyogo prefecture in 2006. The outline of the operation of each airport is as shown in Table 1.

(Table 1) Outline of Operation of 3 Airports in Kansai

	KIX	ITAMI	KOBE
administrator	New Kansai International Airport Company		Kobe City
Operator	Kansai Airports		Kansai Airports Kobe
Opening year	1994	1939	2006
Runway	3,500m, 4,000m	1,828m, 3,000m	2,500m
Annual Aircraft Movements (thousand time)	188	138	27
Annual Passengers (thousand person)	28,807 International 21,906 Domestic 6,901	15,677	3,137
Operation time	24 hours	7:00~21:00	7:00~22:00
Restriction of Aircraft Movements (time / day)	—	370	60

2. History of ITAMI

From the 1960s to 1970s, when Japan's economy was growing rapidly, ITAMI also developed remarkably. In the meantime, a sudden rise in air traffic including jet aircraft aggravated noise pollution in the surrounding areas, creating a serious social problem (Fig. 2). Dissatisfied local residents became organized and sued the national government, the then managing body of the airport, demanding compensation for aircraft noise-related damage and the suspension of nighttime flights. Beside this lawsuit, over 20,000 local residents took part in arbitration calling for the closure of the airport on grounds of pollution. The injunction of night flights was not granted by the Supreme Court, but the national government voluntarily restricted the operating hours to between 7 a.m. and 9 p.m.



(Fig.2) (L) Jet Aircraft Flying in Local Area around ITAMI

(R) Local Residents Protesting against the National Government

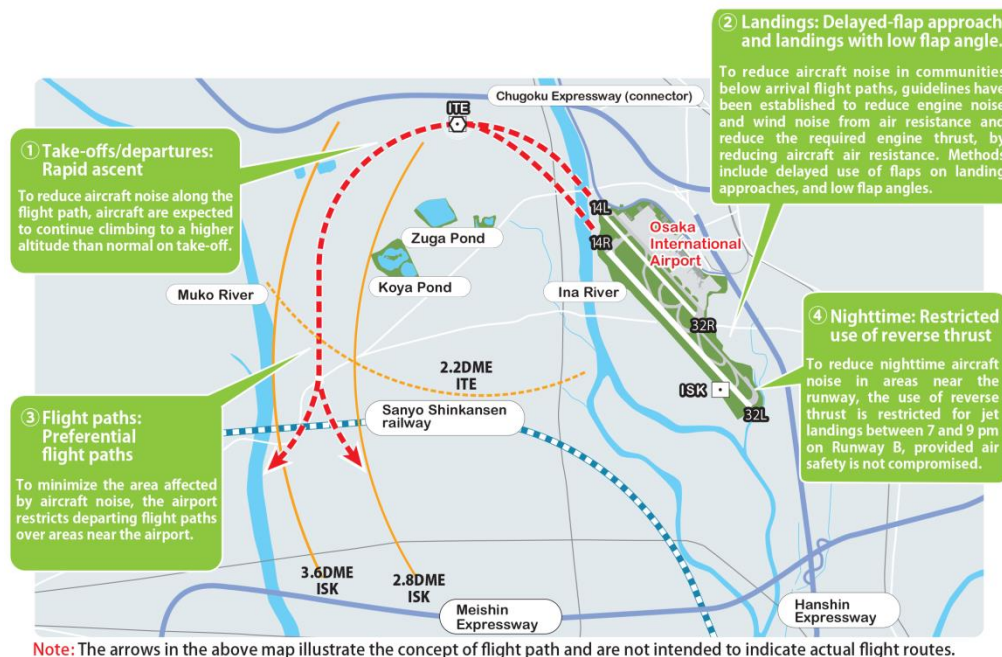
At the same time, in order to solve the noise problem of ITAMI, construction of an airport with few noise problems was promoted, with the view of the closure of ITAMI. However, the development of lower noise aircraft and noise measures were progressed. As the role ITAMI could play in boosting the local economy amid strong air demand in the region became bigger, there was growing consensus among local people that ITAMI should not be shut down.

As a result, the survival of ITAMI was determined with local municipalities and local residents' groups on the condition that the current operation regulation should be maintained for the time being. Even now, the operational restrictions are implemented in keeping the promise with them; for example, the maximum number of times of arrival and departure is limited to 370 in total, and usable aircraft type is limited. Furthermore, the international flights at ITAMI were shifted to the newly opened KIX, thus making ITAMI a rare airport in the world that is named international airport but not served by scheduled international flights.

3. Noise Reduction Measures of ITAMI

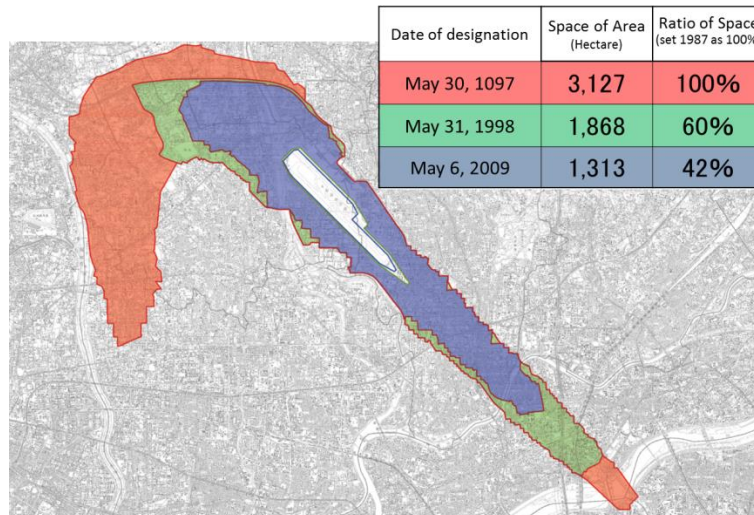
ITAMI has implemented various measures to reduce aircraft noise, including restricting the number of aircraft movements and operating hours, as well as encouraging the use of quieter aircraft, establishing flight procedures that mitigate noise impacts, and constantly monitoring aircraft noise. ITAMI promotes the introduction of lower-noise aircraft through a unique landing fee system, with discounts for lower-noise aircraft and surcharges for higher-noise aircraft, based on actual noise levels measured around the airport. In addition, in order to cut down on nighttime aircraft noise in areas near the runway, the use of reverse thrust is restricted for jet landings on Runway B between 7 p.m. and 9 p.m., provided air safety is not compromised.

Also, in order to reduce the influence range of aircraft noise in the area around ITAMI, a preferential flight path is set and runway 32 is used within a range of not compromising safety (Fig.3). In fiscal 2017 actual results, runway 32 was used at the rate of 99%.



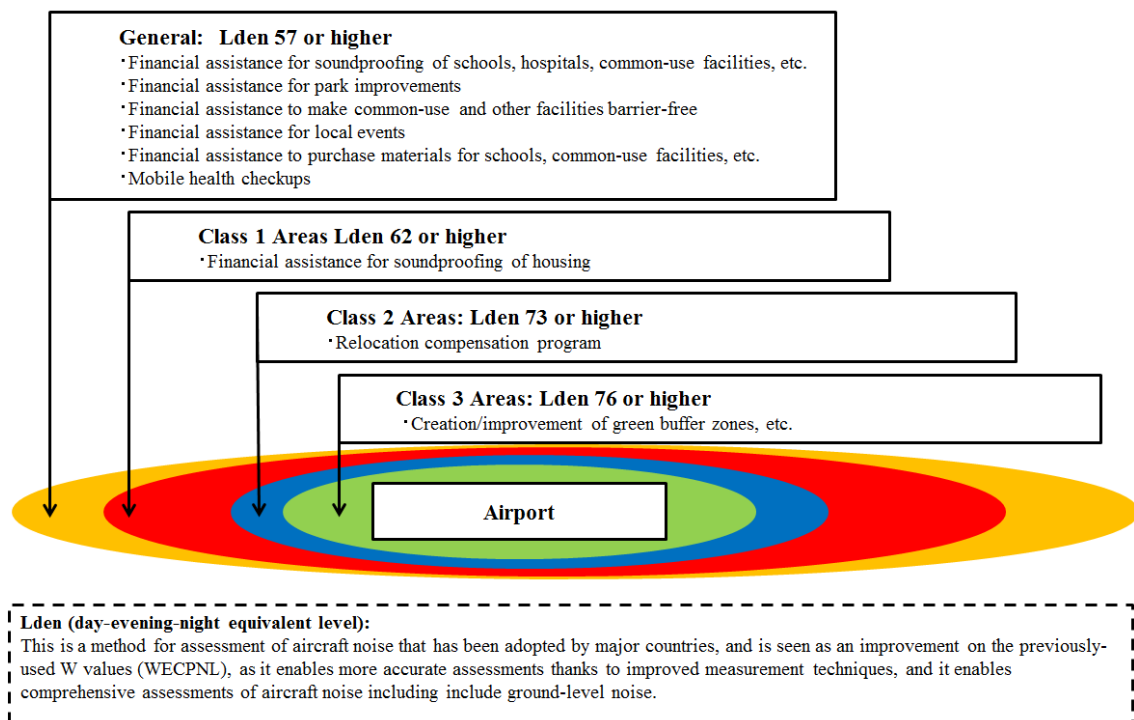
(Fig.3) Noise abatement flight procedures at ITAMI

ITAMI has implemented necessary measures mainly for the residents in the area where noise influence is large, namely noise control area. The noise control area of ITAMI peaked in size in 1982. The area spread to over 3,000 ha, and about 100,000 households lived in the area. Since then, due to the transfer of international flights to KIX, restrictions on operation and the introduction of lower noise aircraft, the noise control area shrank to about 42% compared with the peak time. However, about 40,000 households live in the area, and noise countermeasures are still necessary. (Fig.4)



(Fig.4) Transition of Noise Control Area at ITAMI

We have implemented the following measures around the airport to reduce the noise in the region of ITAMI and improve the living environment. Relocation compensation is applied to areas significantly affected by aircraft noise (Class 2 and 3 areas), and land obtained through this means is used to build parks and green space, in an effort to mitigate noise impacts. In Class 1 areas and their vicinity, upgrades are provided to make housing more sound proof (Fig.5).



(Fig.5) Measures in the region of the airport at ITAMI

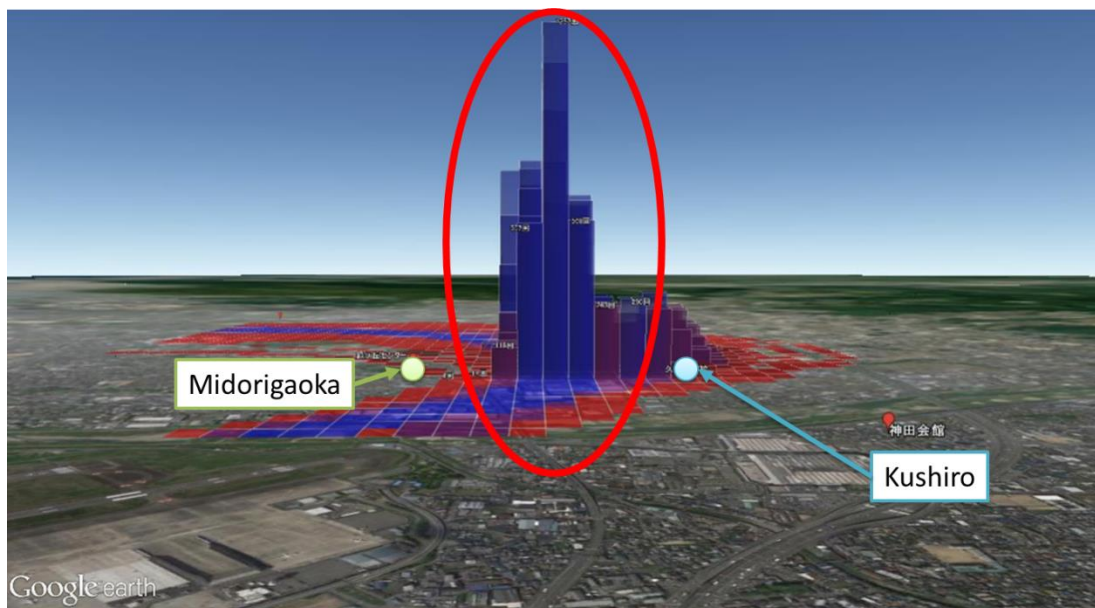
In this way, in Japan, by limiting the flight path, the expansion of the noise influence range is suppressed, and the necessary measures such as soundproof construction for areas with a large noise influence range are implemented.

4. Noise Sharing at ITAMI

ITAMI has two runways, A runway 1,828 m and B runway 3,000 m. In order to reduce the noise influence in the area around the airport, we made an effort to increase takeoff ratio from B runway in 2013. This, however, caused noise influence to be concentrated in some areas, provoking a backlash from local residents. This is the beginning of noise sharing at ITAMI. After that, by monitoring the noise influence around the airport and the change of the composition of aircraft type, we adjust the runway to be used and the usage rate by aircraft type as necessary.

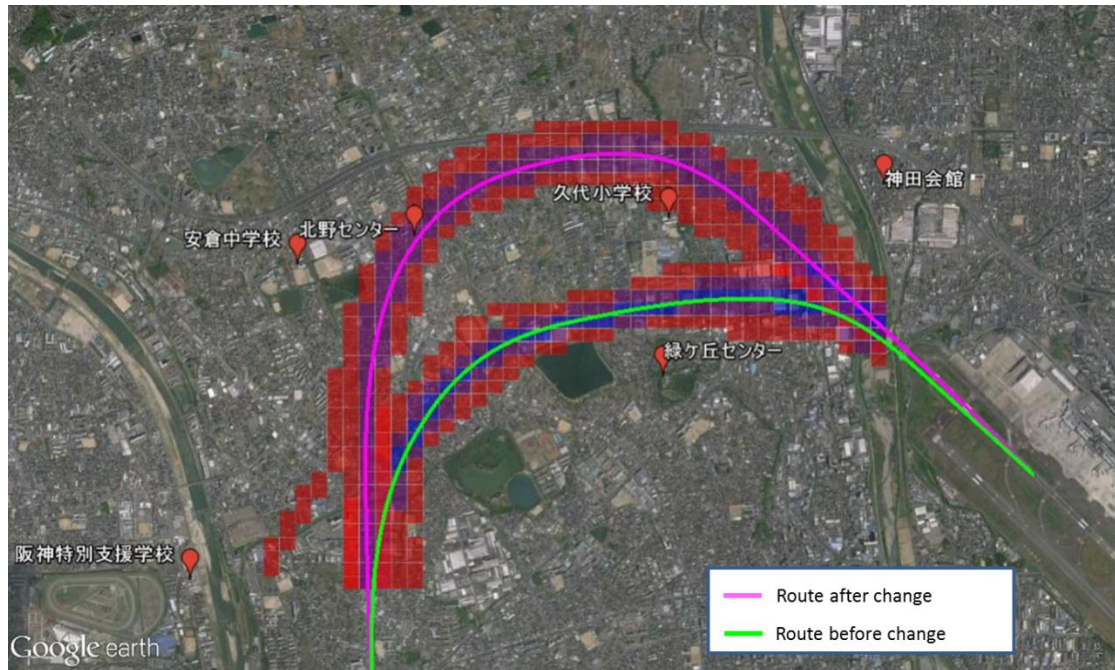
Also, in ITAMI, noise sharing is implemented by setting flight paths by aircraft type and runway. With the improvement of the navigation accuracy and the introduction of the new operation method, the flight path and the noise became concentrated even in the preferential flight path as compared with before. Complaints about constant flight over home were also received from residents around the airport.

Figure 6 shows the number of flights after taking off from the airport in a graph. The flight frequency is represented by the height of the bar graph. The number of flights before the implementation of countermeasures is concentrated in the area surrounded by red circles.



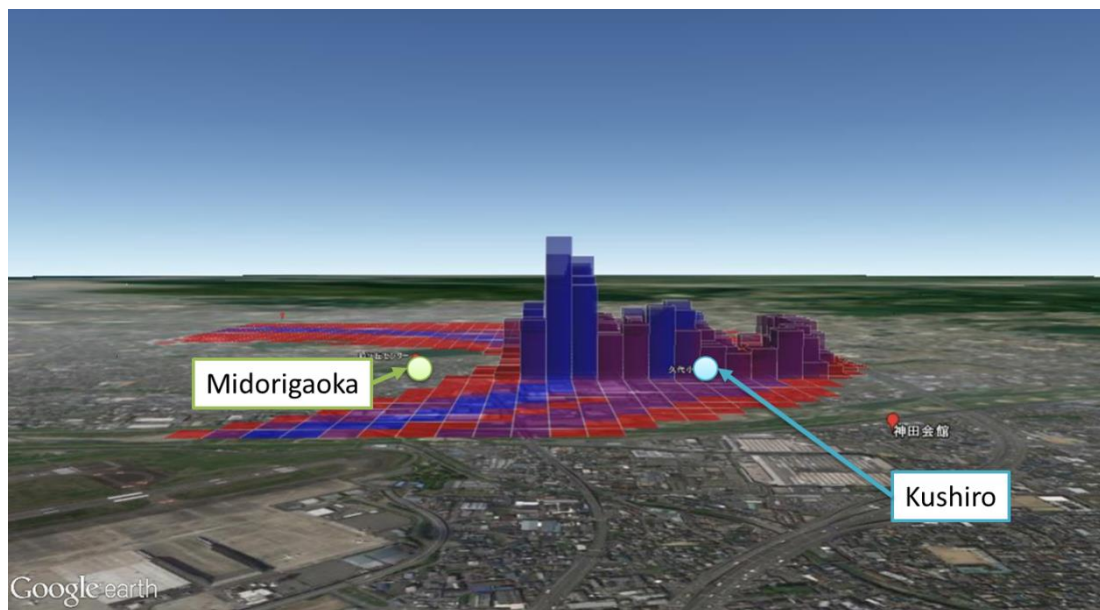
(Fig.6) Flight Frequency around ITAMI before Noise Sharing

Therefore, in cooperation with the airlines, we are implementing measures to set flight routes for each aircraft type and runway within the range of preferential flight path of about 1 mile wide. Specifically, regarding E170 aircraft taking off from Runway A, we changed the route (down) to the route (up) (Fig.7).



(Fig.7) Change of Flight Route of E170 Aircraft

After the countermeasure, it can be seen that dispersion is achieved within the preferential flight path. (Fig.8)



(Fig.8) Flight Frequency around ITAMI after Noise Sharing

The distance of each route is several hundred meters, but it makes a significant difference in how the local residents see aircraft because the airplane flies at low altitude around ITAMI. Regarding the efforts of noise sharing, there was no major opposition from local residents and we believe that it was effective.

As a result of such improvements in navigation accuracy, a new problem has arisen that noise and flight paths become concentrated in some areas. In the future, at urban airports such as ITAMI, it is required to build a good relationship with the community by achieving both noise sharing and noise control that do not broaden the noise impact range.