

Development of Information Services of Honda Moto LINC

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ABSTRACT

In recent years, it has become easy to obtain the desired information in our lives with the enhanced network environment, the spread of smartphones, and so forth. Telematics, together with other services, have created the convenience of a variety of information being available for car users as well. However, thus far, there has been almost no service providing these types of information for motorcycle users. At the same time, motorcycle users have been experiencing strong needs for information that is unique to motorcycle use, such as rain and snowfall information appropriately provided in advance while riding, and parking information for motorcycles as such parking facilities are increasing rapidly.

To provide the information needed for motorcycle users, new services for motorcycle users have been developed such as mapping information of rain and snowfall, and information to inform them in a timely manner as to when to put on rainwear. In addition, the existing services for car users such as maintenance information and fuel economy information have been modified to fit motorcycle users. These applications have been incorporated into Honda Moto LINC service to be released as the first known membership system of telematics services for motorcycle users.

This development has helped motorcycle users to manage the difficulties they face while riding, and has made a significant contribution to expand the joy of using motorcycles.

1. Introduction

The rapid spread of smartphones in recent years is creating a society in which networks and information can be accessed anytime and anyplace. Honda has provided its internavi Premium Club telematics service for some time via vehicle-borne navigation systems and mobile phone data communications. This service increases the comfort and convenience of cars by using real-time information to enable users to avoid traffic congestion, and at the same time provides information useful for road administration^{(1),(2)}. In addition, provision of the internavi LINC service using smartphones also started from the spring of 2011⁽³⁾.

On the other hand, Honda developed the first known built-in-type navigation system for motorcycles exclusively for the large touring model GOLDWING⁽⁴⁾. In addition, other vehicle types were supported using general-purpose retrofitted-type navigation systems. However, none of these systems supported network connections, so there were no telematics services for motorcycle users. Therefore, it was thought that a telematics service for motorcycle users could be provided using smartphones in the same manner as internavi LINC, so efforts commenced to develop a

telematics service for motorcycle users.

The aim when developing motorcycle versions of applications was to provide information services that help address motorcycle user difficulties and also expand the joy of using motorcycles.

Motorcycle structure and usability differ greatly from those of cars, so there are also user difficulties and social demands that are unique to motorcycles. Examples of unique difficulties for motorcycle users include weather issues since the vehicle body structure does not enclose the rider, and countermeasures for the lack of motorcycle parking that has become a social issue in the national capital region in recent years. Unique information for motorcycle users is needed to address these difficulties.

When naming the service, it was thought important to select a name that instantly evokes the image of a Honda brand service for motorcycle users. Therefore, following in the brand image of internavi LINC for car users, the developed service was named Honda Moto LINC to clearly establish it as a unique service for motorcycle users.

Operation of Honda Moto LINC, which is the first known membership system telematics service for motorcycle users, commenced on April 12, 2012. This paper introduces the service contents and functions.

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2. Development of Service Applications to be Provided

To provide the information needed by motorcycle users, it was necessary to develop new services not included in internavi LINC for car users. In addition, applications already being provided to car users needed to be partially changed for motorcycle users.

The investigations and developments performed to address these issues are described in detail below.

2.1. Original New Services for Motorcycle Users

The five items of rain and snowfall map information, information on timing for putting on rain gear, motorcycle parking information, motorcycle dealer information, and touring information were developed as new services specialized for motorcycle users. Each new service is described separately below.

2.1.1. Development of service providing rain and snowfall map information

A service that provides local weather information at the estimated arrival time at the destination already exists as a service for car users. However, in the case of motorcycle touring it is not uncommon for the destination to change due to weather conditions along the intended route. Therefore, providing weather forecasts for the area around the destination and also current weather conditions and forecasts along the touring route in an easy-to-understand format can help address this difficulty for motorcycle users⁽⁵⁾.

When providing rain and snowfall information for use during touring, it is important that current conditions and forecasts be updated frequently, and that weather conditions along and around the route be easy to understand.

In addition, display screens for existing Internet and mobile website weather information services are often divided into prefectural and regional units. Furthermore, prefectural borders and other administrative districts are displayed, but there are few or no road shape indications.

For these reasons, existing weather information services are not suited for applications that view current weather conditions and forecasts along the touring route or for providing enlarged, detailed views of arbitrary areas.

Therefore, the specifications overlay rain and snowfall information onto the road map display screen, and enable the map to be scrolled, enlarged and reduced on the screen.

In addition, the weather information displayed by the rain and snowfall map uses 10-minute increment forecast information provided by the Japan Weather Association (JWA). Rainfall and snowfall information is color-coded into the seven types of 1, 5, 10, 20, 30 and 50 mm or more per hour, and snowfall, and displayed in 2.5 km-square mesh units (Fig. 1).

In addition to current conditions, forecasts are provided in one-hour intervals up to three hours in the future (Fig. 2).



Fig. 1 Rain and snowfall map (enlarged)

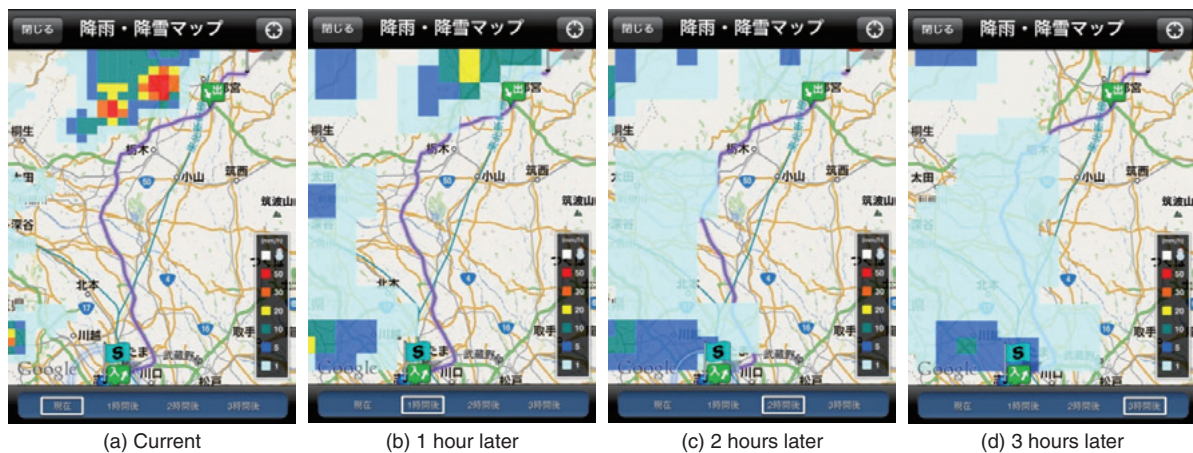


Fig. 2 Rain and snowfall map (Current condition and forecast)

Development of this rain and snowfall map information began as an original new service for motorcycle users, but partway through development it was recognized that this information is also useful for car users and in everyday situations where vehicles are not used, so it was also added as a new application to the internavi LINC for car users.

2.1.2. Information on timing for putting on rain gear

When rain falls while riding a motorcycle, it is necessary to put on rain gear. In this case riders need to secure a space where they can stop the motorcycle safely until they have finished putting on their rain gear, so if the timing when rain gear will become necessary is known in advance, riders can take the necessary measures without having to rush. This type of information can help address this difficulty for motorcycle users⁽⁵⁾.

The internavi LINC for car users provides a heavy rain warning (Fig. 3) for local downpours and other heavy rain as one of its disaster prevention information provision services. A method for effectively using that service as weather information for motorcycle users was investigated.

If the judgment threshold of the heavy rain warning for car users is used as is, it is easy to imagine that the rider's body will already be wet by rain by the time the warning sounds. Therefore, the specifications addressed this issue by using the heavy rain warning judgment logic as is but changing the judgment threshold. The judgment threshold was set at 1 mm or more per hour, which is the minimum rainfall value for the rain and snowfall forecast.

It was understood from past experience that motorcycles cannot be driven comfortably when there is rainfall of 1 mm or more per hour and rain gear is not worn. However, rain clouds were searched for using a prototype version of the rain and snowfall map and motorcycles were actually ridden to confirm just how wet riders actually get and how motorcycle users feel in that condition. The results showed that while there is some difference due to the length of the

time riding in the rain, the changed value of 1 mm noted above was determined to be appropriate as a judgment threshold for the timing to put on rain gear for motorcycles.

In addition, to enhance usability during touring, notification of rain in the direction opposite the direction of travel is unnecessary. Conversely, a function that adjusts the notification timing for rain in the direction of travel according to the vehicle speed would increase the value of the information for motorcycle users. Therefore, the specifications were set so that when the route is set, an alarm is displayed when rainfall of 1 mm or more per hour is forecast in the direction of travel along the route to the destination and the motorcycle position after 20 minutes is predicted to be within that range. This enabled notification of distant rain when traveling at high speeds on expressways, and nearby rain when traveling at slower speeds on ordinary roads. In addition, when the route is not set, the specifications are such that the judgment is made for a range centering on the vehicle's position. This enables notification of approaching rainfall even before setting the route prior to departure (Fig. 4).

This service was named the “Kappa” alarm as a familiar and easy-to-remember name. This name is associated with “kappa,” which is both a type of rain gear and an imaginary water creature that appears in Japanese folk tales.

2.1.3. Development of service providing motorcycle parking information

Parking for motorcycles (excluding bicycles and scooters with engine displacement of 50 cc or less) could be said to almost not exist before 2006. Revision of the Road Traffic Law in June 2006 brought about stricter enforcement of illegal parking rules for both cars and motorcycles. Prior to this revision, motorcycles (engine displacement exceeding 50 cc) were exempt from the Parking Places Act, so there was little construction of motorcycle parking, and enforcement of parking rules combined with this lack of

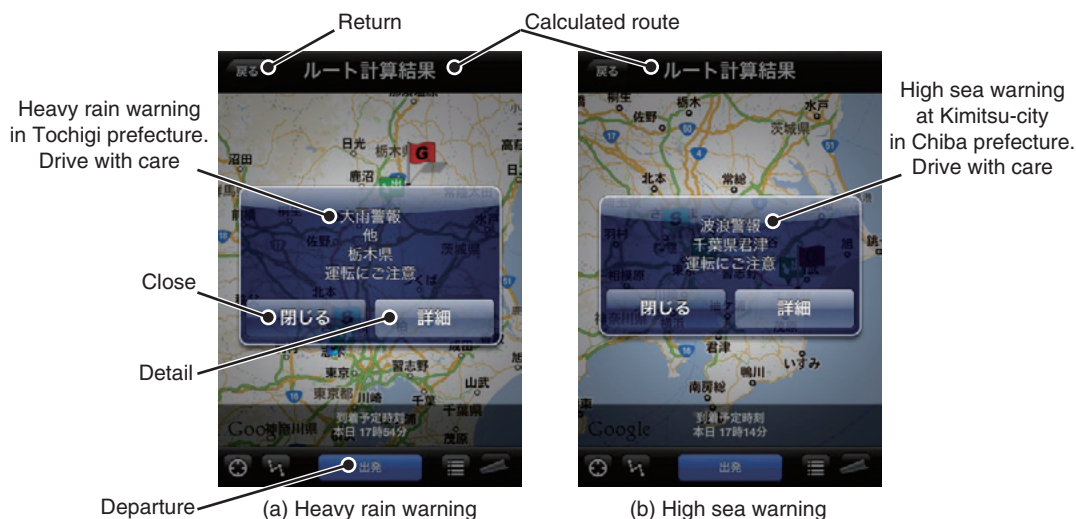


Fig. 3 Warning of bad weather conditions

motorcycle parking became a social issue centering on the national capital region around Tokyo as well as Osaka and other metropolitan areas.

As a result, various municipalities initiated promotional measures such as subsidies, and construction of motorcycle parking has begun⁽⁶⁾, but 60% or more of motorcycle users still experience trouble searching for parking^{(5), (7)}.

It is important to update parking information with regards to crowding, new establishment, discontinuance and other statuses. Construction of motorcycle parking has just started, so there are many changes such as new establishment and discontinuance, which made it an enormous burden to update a parking information database. The motorcycle parking information database released over the Internet by the motorcycle industry group Nippon MotorCycle Association (NMCA) currently boasts the largest data volume in Japan, and is continuously updated.

It was thought desirable to make this information easily available and usable to motorcycle users. With that reason, the Honda Moto LINC top menu (Fig. 5) included an additional link icon for NMCA motorcycle parking information (Fig. 6). This specification enabled motorcycle users to search for parking with simple operations as needed.

2.1.4. Motorcycle dealer information

The ability to easily search for the nearest motorcycle dealer in the event of vehicle trouble while touring gives great peace of mind to motorcycle users. However, information on motorcycle dealers in Japan is not currently compiled into a database, which made it difficult to search for motorcycle dealers even with existing motorcycle navigation systems. Nevertheless, a database specializing in Honda Motorcycle authorized dealers has already been created, and this search page is available on the Honda website.

Therefore, a link icon for dealer search (Fig. 7) was added to the Honda Moto LINC top menu (Fig. 5), and searches using icon button operations were enabled on

the Honda website. This means that whenever the Honda website data is updated, the latest information can even be viewed using smartphones.

At the same time, steps were also taken on the Honda website to support functions linking multiple smartphone applications. This enables jumping the position of the searched dealer to the destination setting of the smartphone locator simply by pressing an operation button one time.

This development enabled continuous operations from searching for a dealer to calculating the route, and enabled providing the service without placing a load on smartphones.

2.1.5. Development of service providing touring information

The drive information provided by internavi LINC includes enhanced content such as recommended spots, but this information is mainly for car drivers. As described above, preferences and purposes for motorcycle touring differ from those for car driving, so original content for touring is demanded.

The required information is described using Fig. 8 and the example of planning motorcycle touring from starting point IC1 to destination Pd.

When driving a car, the destination Pd is generally the final arrival point of the trip or travel, and expressway A or arterial road B is selected as the route from starting point IC1 to destination Pd. On the other hand, the purpose of touring is often simply to enjoy the process of traveling to the destination, such as over hilly winding arterial road C1, small passage D1, or graveled road D3. Therefore, the destination Pd may only have meaning as a turnaround point or a place to stop for convenience.

Drive information for car users is generally edited for use as a reference when selecting the destination Pd, so information on roads such as hilly winding arterial road C1 or graveled road D3 is often not shown. This makes it insufficient as a collection of information to be referenced for motorcycle touring.



Fig. 4 "Kappa" alarm

Therefore, a collection of information for motorcycle touring is desired that not only recommends destinations, but shows recommended routes for enjoying the travel process as content, and has linkage functions enabling selection of a recommended route when calculating the route with a smartphone locator.

Although not in time for the initial release of Honda Moto LINC, touring maps with embedded functions linked to smartphone locators were compiled into e-book format, and have been provided from the end of October 2012^{(8),(9)}.

2.2. Existing Services Changed for Motorcycle Users

The following changes were made to internavi LINC services for car users to make them useful for motorcycle users.

• Maintenance information

Periodic maintenance part types and recommended

replacement cycles differ for motorcycles and cars, so the part types and recommended replacement cycles were changed to conform with motorcycles.

• Fuel economy information

The maximum scale of the graph display assumed only cars, so motorcycles with good fuel economy such as the Super Cub exceeded the graph scale. Therefore, the specification was changed so that the display range automatically expands and contracts in accordance with the fuel economy value. This enabled support for up to a maximum of 100 km/L.

• Member registration

Member registration thus far used the vehicle identification number (VIN) of domestic market cars. However, even in case of domestic market motorcycles, the VIN digit configuration differs from that of cars. In addition, the VIN digit configurations of the large number



Fig. 5 Top menu



Fig. 6 Link icon for motorcycle parking information



Fig. 7 Link icon for dealer search

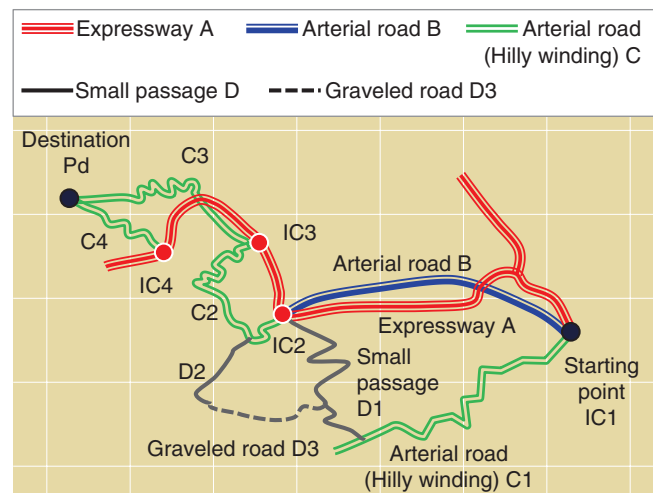


Fig. 8 Road information for motorcycle touring

of imported motorcycles also differ.

Therefore, the member information database was changed to a digit configuration that also enables registration of motorcycle VIN, and a vehicle type database of the 500 or more domestic and imported vehicle types sold from 1980 onward was prepared. This enabled registration of Honda motorcycles regardless of domestic or imported models.

3. User Interface

3.1. Icon and Menu Design Concepts

In addition to content, high added value is also demanded of the menu design to enhance the appeal of applications. Good menu design is also important as a trigger for users to feel that they want to try using the application⁽¹⁰⁾.

The Honda Moto LINC icon appears alongside the icons of other applications on the top menu of smartphones, so it could be said to be the “face” of Honda Moto LINC. The design evokes an image of a running motorcycle, while maintaining design coordination with the internavi LINC icon (Fig. 9).

The Honda Moto LINC top menu image was based on the internavi LINC top menu, and the icon for each function was designed with motorcycles in mind (Fig. 5).

3.2. Transition from the Top Menu to Each Service

The function icon layout on the top menu is based on that of the internavi LINC, with the functions thought to be more frequently used for motorcycles arranged on the top level of page 1 of the top menu, and functions with lower frequencies of use arranged on page 2.

Response times to status transitions and operations were verified from the viewpoint of easy operability. As a result, changes were made such as button designs that facilitate understanding of whether a tap operation or slide operation is required.



Fig. 9 Honda Moto LINC icon

4. Post-release Support

This application was released as the first known membership system telematics service for motorcycle users on April 12, 2012. The total number of downloads exceeded 10 000 downloads in the first month following the release, and 20 000 downloads after six months (Fig. 10).

The total number of downloads as of November 10, 2012 was 14 300 downloads for the iPhone version and 8 500 downloads for the Android version, for a total of some 22 800 downloads.

Prior to release, the application was demonstrated using smartphones at the Automotive Telecommunication Technology Tokyo (ATTT) and the Motorcycle Show (Tokyo, Osaka) held in March 2012, and was greeted with anticipation by many attendees. The number of downloads exceeded 5 000 downloads in the first five days immediately following the release, and this is thought to be due to the anticipation effects of these demonstrations.

The number of downloads per day gradually decreased thereafter, but the total exceeded 10 000 downloads in the first-month period, which included the Golden Week holidays. The number of downloads trended stably at several 10 per day from June onward, and was not seen to change greatly even during the summer vacation period.

The next noticeable change occurred when the e-book format touring map was announced on October 10, with the number of downloads trending at over 100 per day for a five-day period. This increase in the number of downloads even though actual touring map access would not start for another three weeks indicates the high expectations of motorcycle users toward the touring map. Three weeks later, the number of downloads also exceeded 100 per day for about a week starting from the day prior to the start of touring map access on October 31.

Following its release on April 12, Honda Moto LINC received favorable marks from motorcycle journal writers and other journalists as “revolutionary” and “highly

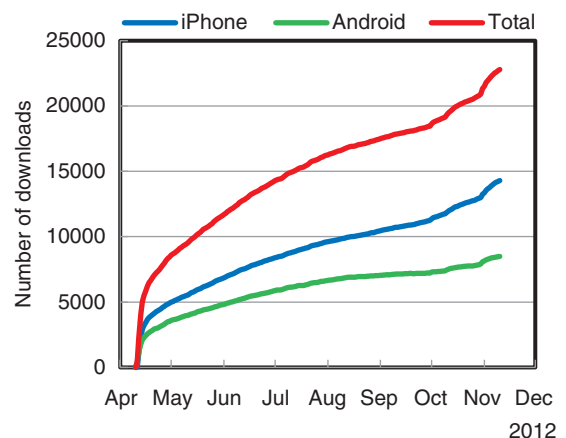


Fig. 10 Download counts

convenient,” including one comment in particular regarding the “Kappa” alarm that the journalist could “feel the love toward riders.”⁽¹¹⁾

In addition, many messages of support were received from Honda motorcycle users for this first approach for motorcycles, along with requests for further enhanced applications and services.

5. Conclusion

Honda Moto LINC is the first known membership system telematics service for motorcycle users, and was developed by creating new services for motorcycle users and partially changing existing services for motorcycle users in order to provide information needed by motorcycle users.

The newly developed services are as follows:

- (1) Provision of rain and snowfall map information
- (2) Provision of information on timing for putting on rain gear (“Kappa” alarm)
- (3) Provision of motorcycle parking information
- (4) Provision of motorcycle dealer information
- (5) Provision of touring information

In addition, services such as the following were developed by partially changing existing services:

- (1) Maintenance information
- (2) Fuel economy information
- (3) Member registration

These developments helped to address difficulties for motorcycle users and contributed to expanding the joy of using motorcycles.

6. Afterword

In order to respond to the high marks and requests for further enhancement received from users following the release of this service, Honda intends to continue proposing new value by further enhancing this application as a new point of contact between Honda and motorcycle users.

The authors would like to take this opportunity to express their profound gratitude to the Nippon MotorCycle Association (NMCA) for their generous cooperation in providing information on motorcycle parking.

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