

## Creating interactive maps using Flash

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Many sites on the Web include interactive maps. Maps are particularly useful on travel related sites where they are used to show cities served and routes between the cities. Often when a point on the map is clicked an animated travel route is displayed or there is a link to additional information. The websites of Southwest Airlines, Easy Jet, AirEuropa, Air Berlin, (air); RENFE (rail); and Silja Line (ships) include examples of interactive maps. Macromedia's Flash is used to create these maps. This paper will discuss how Flash can be used to create interactive maps. The Flash features discussed include creating buttons, the use of scenes, and the display of text, sound, video, and animated objects.

**Keywords** Flash; interactive; maps

### 1. Introduction

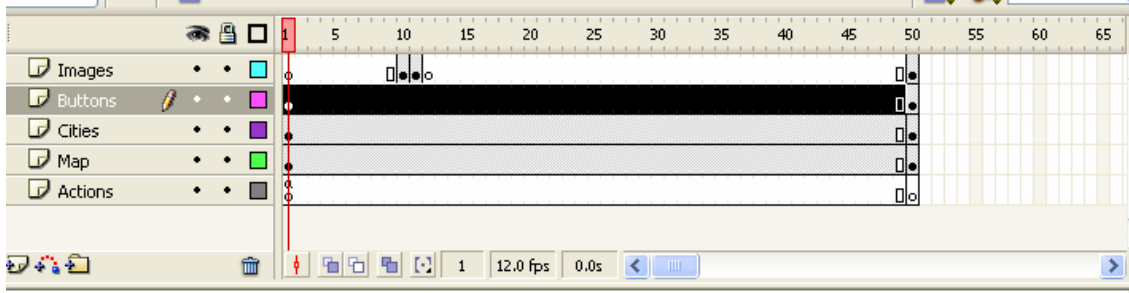
Throughout this paper an example adapted from the m-ICTE2006 conference web site will be used to illustrate the development of a Flash mapping solution. The web site lists four options for flying from Madrid to Sevilla. Nonstop or, by way of Barcelona, Valencia, or Palma de Mallorca. A map will be created and city markers and labels will be added. The city markers will be defined as Flash buttons. These buttons will be programmed to display external web pages or internal Flash content. The map, city markers, labels and named layers are shown in Figure 1. An online version of this paper that includes working examples will be available at <http://home.southernct.edu/~workmanr1/FlashMaps.htm>



**Fig. 1** Flash map showing city markers.

Flash is used to create interactive content. It supports the display of images, animations, sound, and video. Flash players are available on the vast majority of computers. If the player is not available it can be downloaded from <http://www.adobe.com/>. Flash playable output is known as a Flash movie. Flash movie files may be inserted into web pages. They have a SWF extension. The Flash program saves FLA files. FLA files can be edited but they cannot be played on the Internet. The Flash movie designer creates Flash movies using the Flash Window. The Flash window includes toolbars, a property inspector, a stage which contains the visible parts of a movie, and a timeline which is used to control the display of Flash elements such as images and buttons. The timeline is organized by layers which in turn are made up of frames. A frame represents a single moment in a movie. Giving the layers meaningful names is both an essential and an easy way to document a project. The "Insert Layer" icon is used to

add layers. In this example layers have been named “Map”, “Cities”, “Buttons”, “Images”, and Actions. The timeline used for the example map is shown in Figure 2. Flash also includes a set of drawing tools such as brush, pen, eraser, text, and paint bucket. The brush tool has been used to draw a map, the text tool to label the cities, and the oval tool to create city markers.



**Fig. 2** Flash timeline showing named layers.

### 2.1 File formats and templates

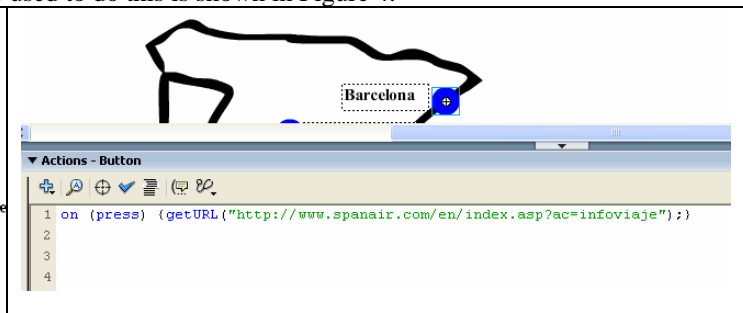
Frames contain Flash images or actions. A frame where a change takes place must be designated as a key frame. Selecting a frame and clicking the F5 button will insert a key frame. The Map layer shown in Figure 1 contains the map. A key frame has been inserted at Frame 50. This insures that the map always displayed as long as the movie has no more than 50 frames. Images in a higher layer display on top of images in lower layers. If images are placed in a series of frames animation will take place. A *stop* instruction has been placed in the first frame of the action layer. This insures that a still image will be displayed when the movie is opened

### 2.2 Programming Buttons

Buttons are created by selecting *Insert > New Symbol > Button*. A button definition window is then displayed. This window is used to draw the up, over, and down states of the button. For this example a blue circle, drawn with the Flash oval tool, will be used for the up state and a gray circle for the over state. These buttons are programmable. Figure 3 shows the Barcelona button selected. Programming is done by selecting a button and displaying the “actions” pane. The Flash Actions Pane, is used to add programmed instructions to a Flash movie. The “on” instruction is used to select an event such as press, release or rollover. Some useful instructions are *getURL*, *gotoAndStop*, and *gotoAndPlay*. The *getURL* instruction is used to create a hyperlink. For example the Barcelona button is programmed with *onPress* and *getURL*. When the button is clicked a hyperlink is opened and the Spanair route map is displayed. The Flash Action Script code used to do this is shown in Figure 4.



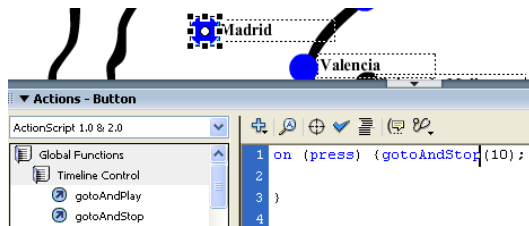
**Fig. 3.** The Barcelona button is



**Fig. 4.** Code that will cause the Spanair route map to display when

clickable.	the Barcelona button is clicked.
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The *gotoAndStop* instruction sends Flash to a specified frame. An image of the Madrid to Seville timetable has been placed in Frame 10. When the Madrid button is clicked the image in frame 10 is displayed. The code is shown in Figure 5. Figure 6 shows the display.



**Fig. 5** Action Script that displays an image in a frame



**Fig. 6** The contents of frame 10 displayed.

The *gotoAndPlay()* instruction sends Flash to a specified frame. The content of the frame is displayed and then Flash moves on to the next frame and so on until a *stop()* instruction is encountered. Displaying the contents of one frame after another results in the user seeing an animation.

### 2.3 Animation

An animation is created by drawing a series of shapes. To show an animated of the route between two cities. A starting frame is selected, made a key frame and a short line is drawn. In the next frame the line is lengthened and so on until the second city is reached. The departure city button is programmed, “*on (press) {gotoAndPlay(20);}*” When the button is pressed Flash goes to frame 20 and plays succeeding frames until a stop instruction is reached. A series of lines played one after another appear as an animated line. The Air Europa route map, [http://www.air-europa.com/en/guia\\_pasajero/mapa\\_destinos/default.html](http://www.air-europa.com/en/guia_pasajero/mapa_destinos/default.html), uses route animation

City markers can be animated. These animated markers are known as animated buttons. Animated buttons are created by creating a flash movie and then inserting the movie in a button’s up, over, or down state. The animated button movie can be as little as two frames long. For example, if a blue circle is drawn in frame 1 and a green circle is drawn in frame 2, the result would be a button that blinks blue and then green. The AirEuropa Flash routemap marks cities with animated flash buttons.

### 2.3 Sound and Video

Sound and Video Sound and video files can be imported into Flash (*File>Import to Library or File > Import Video*). These files can then be inserted at a key frame. When an, *on (press) {gotoAndPlay(frame);}* is executed and the target frame contains a sound or video, the media files are played.

### 3. Flash Map Examples

The few instruction just described can be used to create a powerful mapping solution. A good example of the use of these techniques is the Southwest Airlines route map, [http://www.southwest.com/travel\\_center/routemap\\_dyn.html](http://www.southwest.com/travel_center/routemap_dyn.html) . On this page a map of the United States is displayed. Each of the 61 cities served by Southwest is labeled and marked with a small button. When the button is rolled over, routes from the city are shown by lines that connect the selected city to destination cities. An additional option on the webpage allows the user to see only nonstop flights from the selected city. The Flash application is quite simple but very effective in showing where Southwest flies. Spanair's route map, <http://www.spanair.com/en/index.asp?ac=infoviaje>, displays nonstop routes departing from the rolled over city but does have the option of showing direct or connecting routes. Easy Jet, <http://www.easyjet.com/EN/routemap/>, has a similar map but adds clickable marker buttons. When a button is clicked a site is displayed showing information about the city, travel options from the airport, and related links. Ryan Air, <http://www.ryanair.com/site/EN/dests.php?flash=chk> , also has a similar map with animated clickable buttons. Flash mapping of course is not limited to airlines. Metrolink, <http://www.metrolinktrains.com/> , a California passenger railroad system, uses Flash animation to show the cities served by each of its lines. When part of a line is clicked the entire line is highlighted. The ferry routes of Europe are shown on the Direct Ferries route map, <http://www.directferries.co.uk/routes.htm>, The user selects departure ports and then uses a dropdown menu to obtain detailed route information. RENFE, <http://horarios.renfe.es/hir/ingles.html>, uses Flash mapping in a different way. When the name of a train is rolled over the route and the names of major cities are displayed on a separate map.

### 3. Conclusion

Techniques have been shown that can be used to create Flash maps with clickable cities that display routes, images in Flash frames, or link to external web sites. These simple techniques can be used to create maps that are useful for making travel related decisions. For more information about Flash see [1,2,3].

### References

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