

# Portable Multi-Media Entertainment Device for Airline In-Flight Entertainment

## Case Study



### Background

- Customer required mobile in-flight entertainment system
- Needed to support rich-media services, but at a low cost

### Challenge

- Many complicated multimedia requirements
- Advanced embedded system design
- TSE required to design, prototype, tool, certify and source vendor supply chain
- High visibility: previous product now an industry standard

### Solution

- Semi-rugged hardware/software system based on Intel / Linux
- 50% less volume/ weight than industry leader
- All specifications met, most exceeded

### Background:

digEcor™ is the market leader in the portable In-Flight Entertainment industry, with over 26 major and regional airline customers worldwide. Recent competitive pressures have forced their customers into unique ways of differentiating themselves through customer service, flight options, and most important to premium customers, in-flight entertainment. With advances in consumer electronic technology, their customers' expectations of in-flight entertainment have risen substantially, with portability and on-demand services being the top requests. To make matters more difficult, digEcor's customers are under incredible market pressures to streamline operations and reduce operating and capital expenditures.

### Challenge:

The challenge was for TSE to design, prototype, tool, certify and source the complete vendor supply chain for a highly portable, very low-power, low-cost entertainment device that supports/features:

- AC / DC or PoE power
- 802.11 WLAN to facilitate content uploads, credit card transactions and usage statistics
- 60 GB HDD Storage
- 8-inch TFT screen
- Integrated credit card swipe
- 10-hours continuous battery operation
- Full-motion DVD quality MPEG-4 video, MPEG2 video and MP3 audio
- Strong content encryption
- Dynamic network-provisioned services
- Hand held portable form factor
- Weight of less than 3 lbs

The stakes were high, as this new device was slated to augment digEcor's popular digEPlayer™ 5500, the world's first self-contained, hand held portable video on demand (VOD) entertainment unit, and the winner of the 2004 IFE (In-flight Entertainment) product of the year award. Further, the production capacity was estimated to exceed 1000 units per month, meaning the device needed to be manufacturable at a high quality level in large quantities.



### Solution:

TSE leveraged its strengths in embedded primary design engineering and new-product-introduction services to create an end product that came in on time and exceeded customer specifications.

One of the early challenges was in the design and prototype of a very dense 12-layer PCB with multiple ball grid array devices. The first articles passed all diagnostics at power-up, enabling digEcor to successfully demonstrate early units to client and at major industry events.

TSE's materials engineers chose a semi-rugged packaging system that came in at 10.6 x 6 x 1.2 inches, with the integrated credit card reader and full custom Li Ion "Smart Battery" pack. At < 2.5 lbs including battery, the system came in not only below specifications, but its weight and case volume were 50% less than Panasonic's state-of-the-art competitive unit at the time. Further, its internal hard drive, coupled with the system software provided media storage for up to 50 hours of DVD-quality full motion video. Two independently controlled headphone jacks were also added to the design such that each passenger could listen at their own volume level.

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On the software side, TSE chose a Linux operating system with an XML/HTML-based user interface. This was chosen as it supported a wide range of royalty-free applications that offer on-line shopping, games, audio/video libraries, and a wide variety of graphically-viewable content such as e-books and magazines. The software provided full international language support for all content types, as well as full customization support of content for each airline.

On the certification side, TSE engineers took the device completely through all stages of FAA, FCC, CE and UL compliance, and also through stringent studio anti-piracy security requirements.

In the end, TSE took the new product from initial requirement capture to volume production well within 12 months, meeting or exceeding customer requirements every step of the way. digEcor has subsequently secured several airline deals using the TSE-produced devices.