Handheld AIM: Challenges and Solutions

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Challenges

Aviation handheld devices :
A more challenging environment

- Slower processor speeds
- Less system storage & RAM
- Smaller displays
- Limited internet bandwidth

Challenges : Processors

Handheld device processors might be…
- … Running lower clock speeds
- … Incompatible with Windows/Intel x86
- … Performing more duties (LCD, I/O)

Challenges : Storage & RAM

Handheld device storage might be…
- … Under 64 megabytes
- … Volatile (if RAM)
- … Slow to access (if Flash)

Handheld device RAM might be…
- … Under 64 megabytes

Challenges : Displays

Handheld device displays might be…
- … As small as 176x220
- … Limited to 65k colors
- … Slower to update
- … Harder to see in sunlight

Challenges : Bandwidth

Handheld device bandwidth might be…
- … Much slower (ADS-B, Cell)
- … Download-only (XM, Broadcast)
- … Insecure
- … Intermittent
- … Firewalled

Challenges : Summary

Clearly, the software operating environment in a hand-held device is much more limited than on a desktop computer, laptop, or tablet.

It requires custom solutions that can address all of the possible limitations, while making it possible to take advantage of some systems with more capabilities.

Solutions

Some strategies for retaining performance while addressing limitations:
- Design compact transmission formats
- Design compact storage formats
- Design formats with high run-time efficiency

Solutions : Transmission

Two things work against each other, which must be balanced:

- Interoperability requires that the data be transmitted using standards accepted by all manufacturers
- Bandwidth Conservation requires that the transport standards have methods to make the data more compact

AIXM/WXXM can fulfill this role, if WFS implementation supports returning compressed streams. It may be useful to explore possible means of representing AIXM

Solutions : Storage

Once the data is on the handheld, it can be converted to and stored in a format specific to the software vendor.

A "packed binary" proprietary format can …

- Be compact, reducing needed storage
- Use native numeric representations, improving efficiency of use
- Be sorted, improving spatial searches

Summary

By paying attention to the available AIXM, WXXM, and WFS technology, we can improve the performance when downloading the available data on a handheld device.

By designing appropriate proprietary formats, vendors can reduce the required local storage while increasing the efficiency of searching, accessing, and rendering the data.

In the future, it might be worth designing a "compiled" format for the XML, so that client-end conversion and proprietary formats would not be needed.

Questions?