Follow-on Report of activities of the GNSS SDR Metadata Standard Working Group

International Technical Meeting

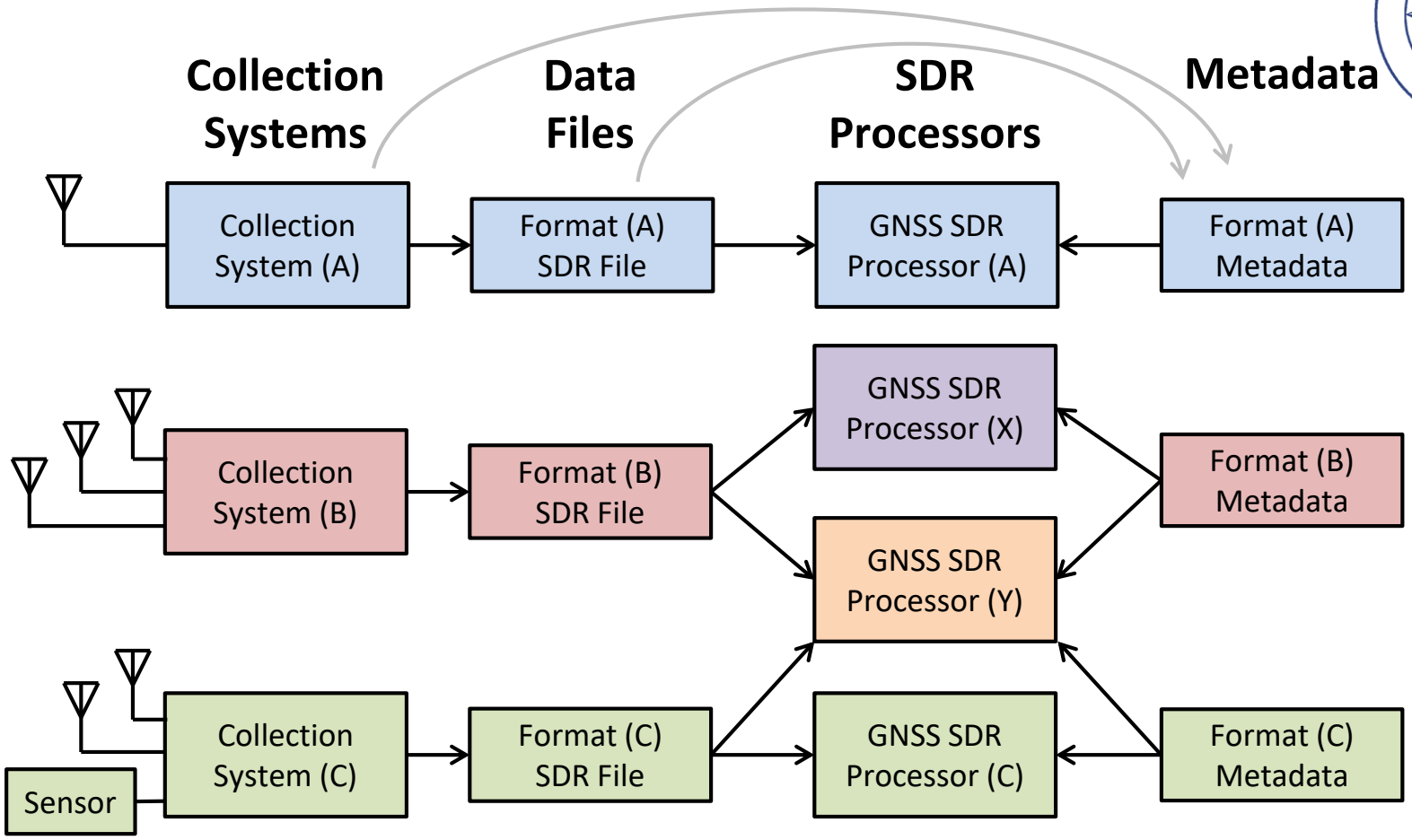
January 27, 2015

Dana Point, CA

Background

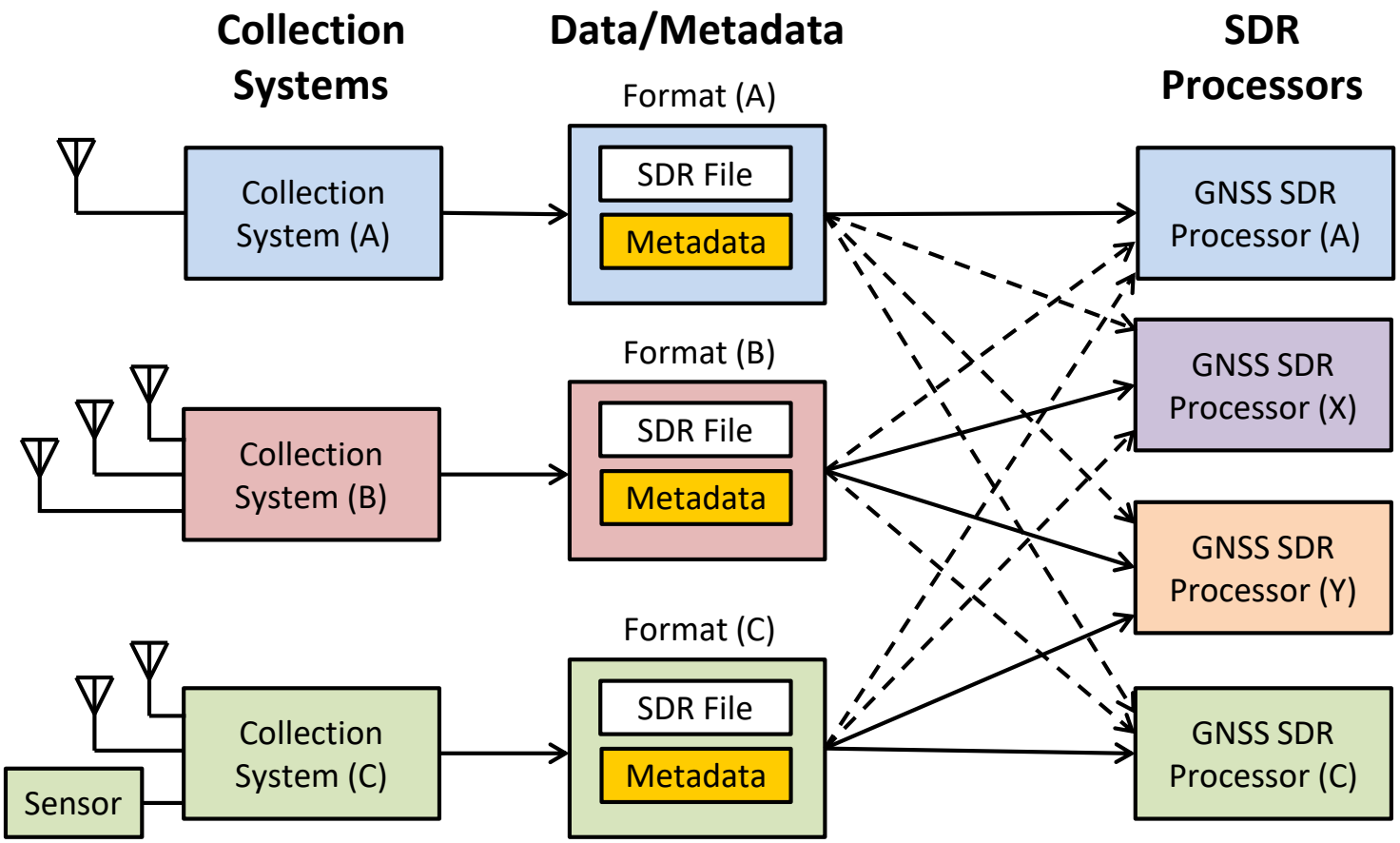
- Proliferation of GNSS SDR technology in the past 5-10 years
  - Low-cost front-end hardware and data collection systems
  - Maturing GNSS SDR processors, receivers and software frameworks
- Today: no established standard to convey GNSS SDR metadata
  - Existing metadata standards not well suited for needs of GNSS SDR and PNT community
- ION SDR Metadata Standard
  - Objective: Interoperability between GNSS SDR data collection systems and processors

The Problem:



- Some front-end/DCS and SDR processors are bound to one another
- Ad hoc metadata exchange – prone to human error
- Does not promote interoperability
- Does not promote data/resource sharing and re-use

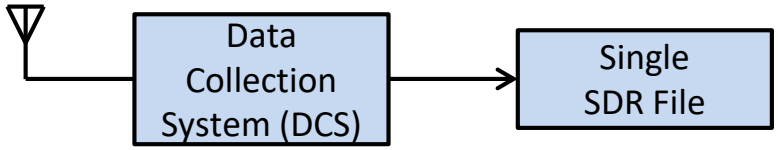
Proposed Solution: Metadata Standardization



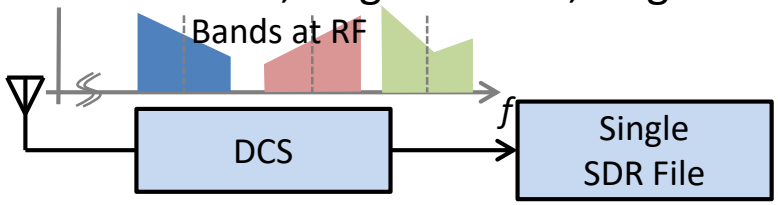
- Unambiguous transfer of all essential SDR metadata
- Standardization encourages vendors to support major formats
- Spurs community to develop open-source software handlers and plug-ins
- Promotes interoperability
- Promotes data portability, resource sharing and re-use

System Topologies

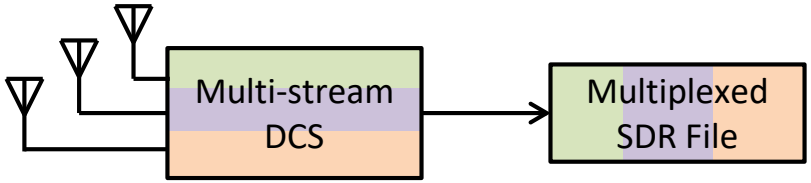
Single band, single-stream, single file



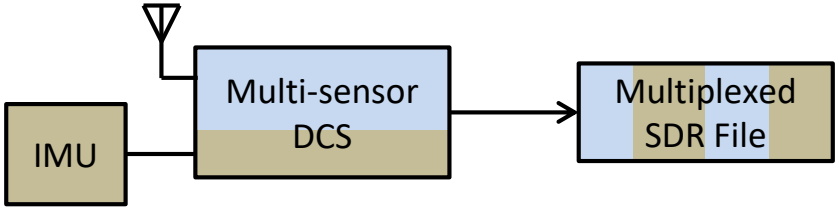
Multi-band, single-stream, single file



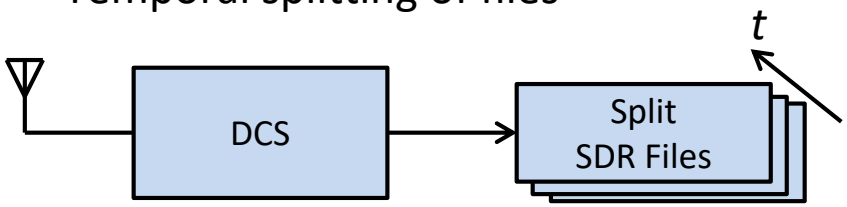
Multi-stream, single file



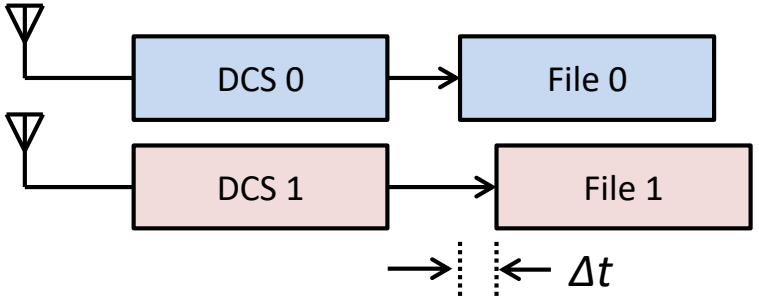
Multi-stream, single file



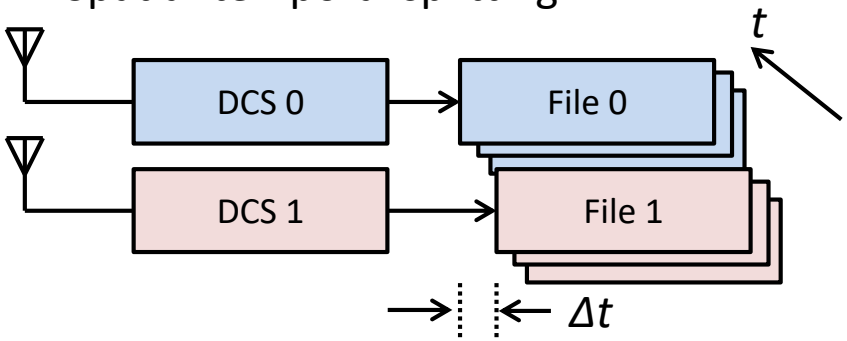
Temporal splitting of files



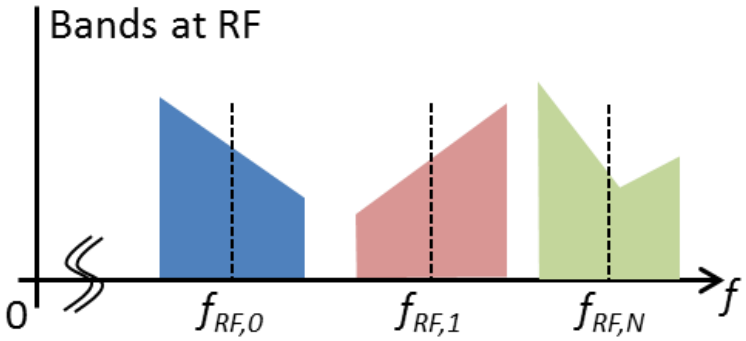
Spatial splitting of files



Spatial-temporal splitting



Domain Model



Core Metadata Classes

- Session
- System
- Cluster
- Source
- Band
- Stream
- Lump
- Chunk
- Block
- Lane
- File
- FileSet

SDR Data Collection System

SDR Files

Metadata

SDR-WG Progress since Sept 2014

- Sept. 9: First in-person meeting
  - 30 attendees
  - Draft specification presented and discussed
  - Ad-hoc ‘coding subcommittee’ proposed
- Sept. 12: Initial report at ION GNSS+ 2014
  - Presented at software receiver session
  - Attendees encouraged to join and participate
- Sept 2014 to Jan 2015:
  - Added 15 members to WG (64 total)
  - Online discussions
  - Created ION GitHub repository
  - Developed draft XML schema (XSD) and API
  - Released draft standard document to WG

Major Accomplishments

- Draft standard document available to working group
- XML Schema Definition (XSD) available to working group
- Draft C++ API available to Working Group
  - Fully open-source (LGPL license)
  - Creates standard-compliant XML files
  - Reads standard-compliant XML files
  - Successfully integrated and tested on IFEN's SDR product
  - To be integrated to Loctronix's SDR products
  - Ready for download and testing on GitHub: https://github.com/IonMetadataWorkingGroup
- Current Plan for Draft Standard
  - 4 weeks of alpha testing
  - 4 weeks of beta testing
  - Formal 1.0 release of draft standard expected in April 2015

Next Steps

- Formally release ‘draft’ standard and functional API by April 2015 (Pacific PNT)
- Public comment period of several months (on ION website)
- Legal review *after* standard is informally adopted
- Official adoption as ION standard: ION GNSS+ 2016

Acknowledgements

- Thomas Pany (IFEN): WG Co-chair, Software API
- Mike Mathews (Loctronix): XSD spec., C++ API, GitHub
- Mike Braasch (Ohio U.): Geometry parameters
- Dennis Akos (U. of Colorado) & James Curran (Joint Res.Ctr.): Oscillator parameters
- WG members