GLAST Large Area Telescope

Instrument Flight Software
EM2 Review
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Telecommand and Telemetry Database Services

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Telecommand and Telemetry Database: Requirements

- **Flight Software General Requirements:**
  - **Req. 5.3.4.4.1: The SIU FSW shall provide housekeeping data to the SC via the CTDB, on a schedule defined in [7]. The contents of this data set shall be as defined in the LAT Command and Telemetry List (TBS).**

- **Flight Software General Requirements (derived):**
  - **The Telecommand and Telemetry Database function shall generate a data dictionary defining the full set of telecommands and telemetry associated with the instrument FSW component of the mission. This data dictionary shall be provided in a format that can be processed to produce ITOS, or other representations of the data.**

Telecommands and Telemetry Database: The Issue

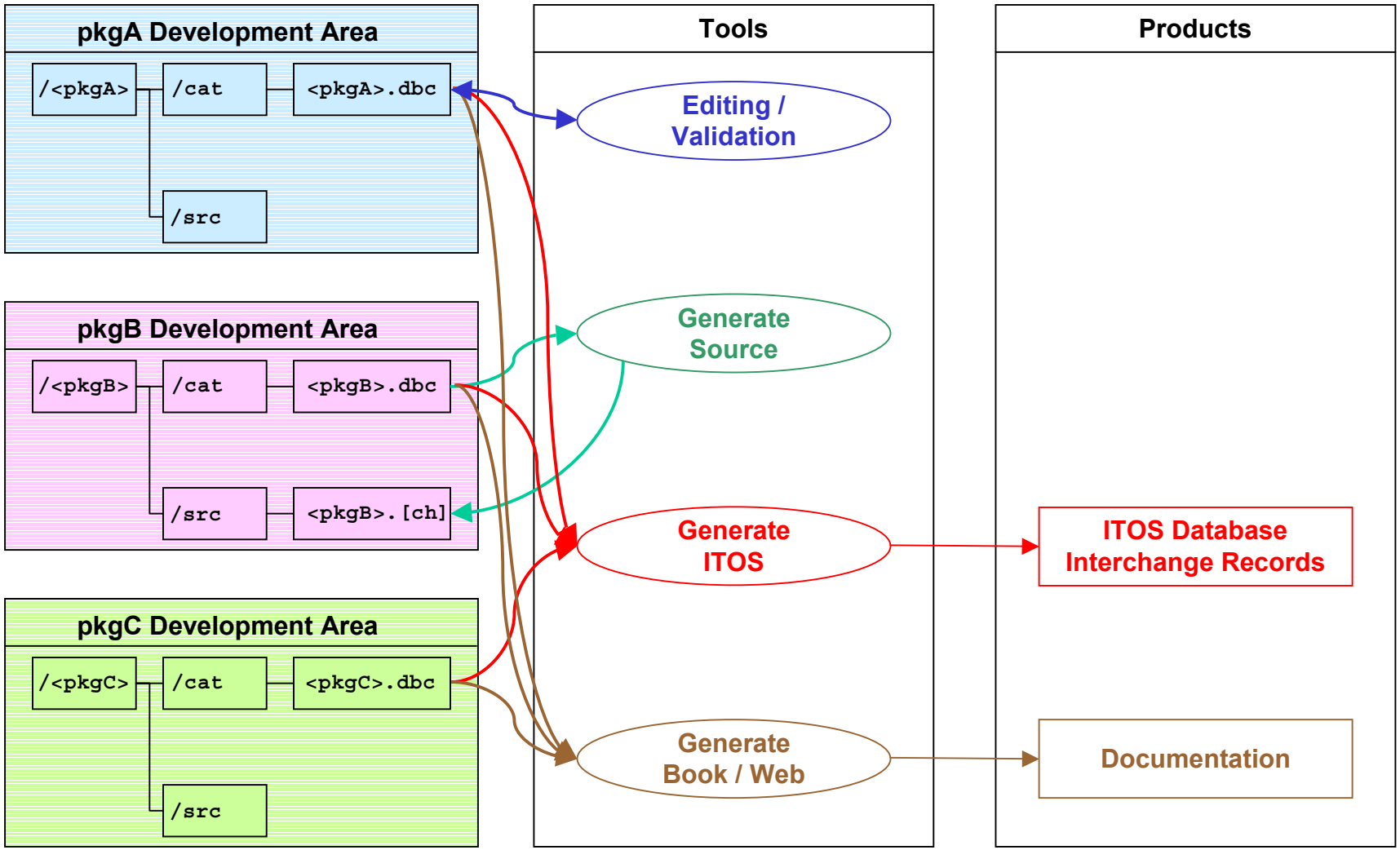
- **Constraints**
  - During the mission, MOC will use the Integrated Test and Operations System (ITOS)
  - During satellite integration, Spectrum Astro will use an ITOS compatible system
  - LAT FSW must produce a telecommand and telemetry database dictionary
  - LAT FSW must produce code corresponding to the telecommand and telemetry database document

- **Many products, but all derived from the same basic information**
  - A maintenance nightmare, if all products are maintained independently

Telecommands and Telemetry Database: The Design

- A tools-based approach
  - Define a private, XML-based representation of this information
  - Provide an editor tool to manipulate the XML files
  - Provide extraction tools to produce
    - ITOS database interchange records
    - Telecommand and telemetry web pages and book
    - Source code for inclusion by FSW applications
- Integration into developer's environment
  - Any package defining telecommands or telemetry will have a `/cat` directory
  - Developer will create package-specific telecommand / telemetry XML files in `/cat`
  - XML files are code managed under our present system
  - Deriving source code files from XML files will be built into our build scheme
- ITOS, books and web pages are created by processing `/cat` directories in all packages

Telecommands and Telemetry Database: Workflow



Telecommands and Telemetry Database: Testing

- **By and large, this function will be tested in use, through verification and inspection:**
  - **As FSW code packages that consume telecommands and return telemetry are refined and completed, developers will check that valid source code was generated by the T&T database tool set.**
  - **As FSW hardware subsytems are refined and completed, engineers will send telecommands generated using the T&T tool set and verify in action whether the appropriate telecommands are sent and correct telemetry is received.**
  - **As consumers such as the ISIS and the ISOC utilize the data dictionary, they will validate that the correct representation of T&T data has been delivered.**

Telecommands and Telemetry Database: Consumers

	Test Stands		ISIS	I&T	FSW Test-bed	FSW Deliverable
	TKR,CAL	ACD				
Telecommand/telemetry database and services			Y	Y	Y	Y

- **Status:**
  - A production implementation of the T&T database function is complete. The next step is to populate a data dictionary with telecommand and telemetry definitions and begin generation of derived products.
- **ISIS:**
  - Spectrum Astro will need an ITOS version of the telecommand and telemetry data dictionary.
- **I&T:**
  - At each major software build, I&T will need the latest data dictionary.
- **FSW Test-bed:**
  - The software team will need ITOS and source code generated from the latest data dictionary for SIIS testing of each software build.
- **ISOC:**
  - At every software build, the ISOC will need the latest data dictionary to build ITOS command sequences.