

FDIR: state of affairs

ADCSS 2015 – Wed 21 Oct – PM; session convenors:
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Objectives of this session



The purpose of this session is to assess *the current state of practice in industry* and *state of the art in academia* with respect to FDIR, both in terms of *effective analysis and design methods* and *process support* for *spacecraft engineering* as well as *independent verification and validation*.

Follow-up to similar survey performed at ADCSS 2011, outcome:
FDIR development generally seemed to lack a systematic approach as part of the core architectural concept rather than an add-on approach to the nominal spacecraft capabilities, eventually leading to unjustified increase in the FDIR complexity.



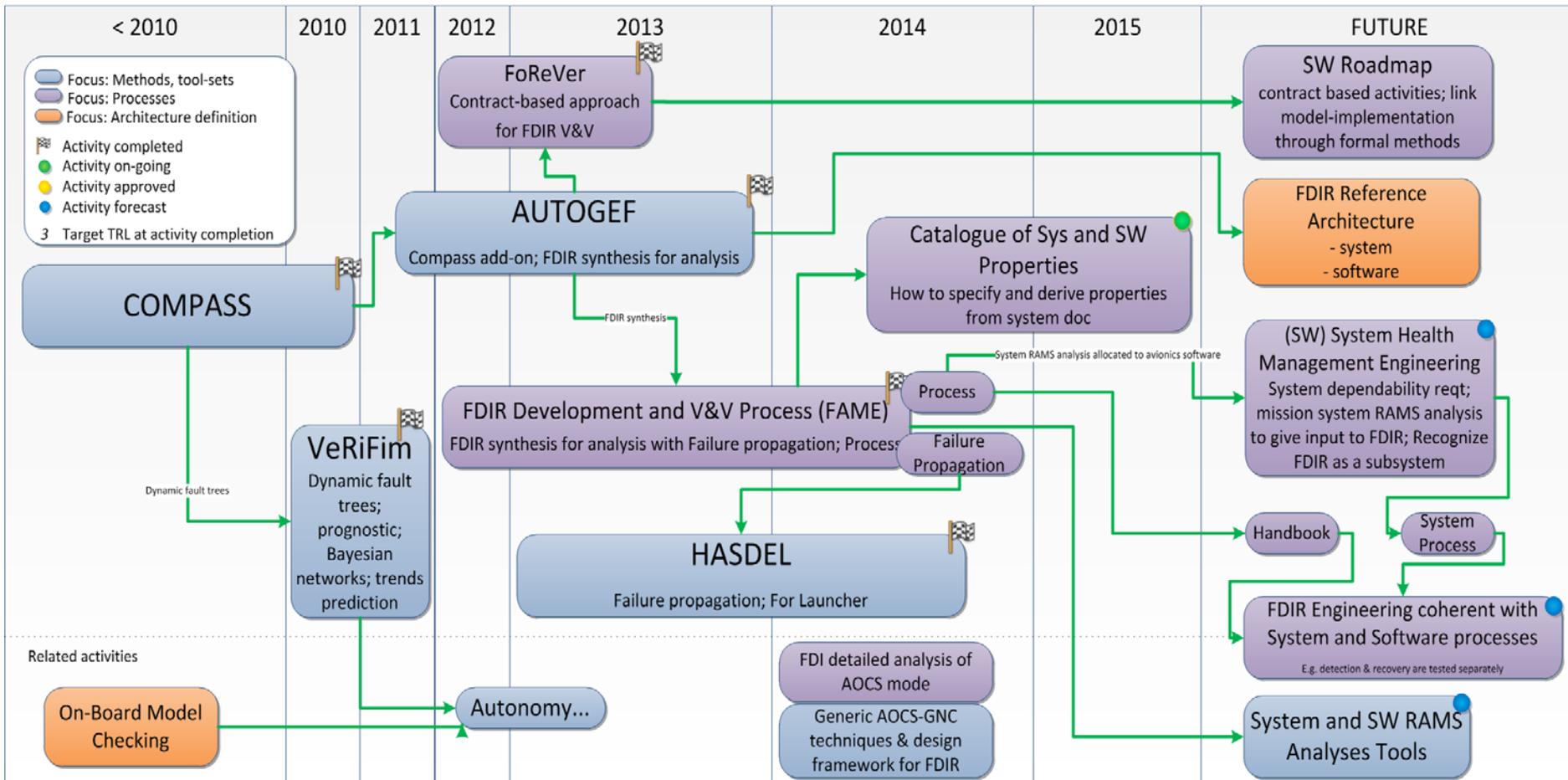
- FDIR “**emerge**” from the engineering process by necessity rather than by conscious intention → no dedicated process, no support tools
- For each mission, the “general logic” is twisted to fit the numerous **particular cases** that are discovered when running scenarios → uncontrolled design
- The system FDIR concept and the software FDIR component claim to have a “general logic” (e.g. reconfiguration levels), but happen to be a **toolbox** to monitor and reconfigure more or less everything → over design
- The **verification** of the system FDIR is difficult and requires tuning (usually experimentally) a lot of parameters in the software FDIR component → cost and delay in integration
- FDIR is the “complexity sponge” with major impact on AOCS, software and V&V

- Support FDIR process with a model based approach
 - Tools are required to manage this complexity
 - Support early analysis and to enable reuse
 - Fully embedded in the engineering process

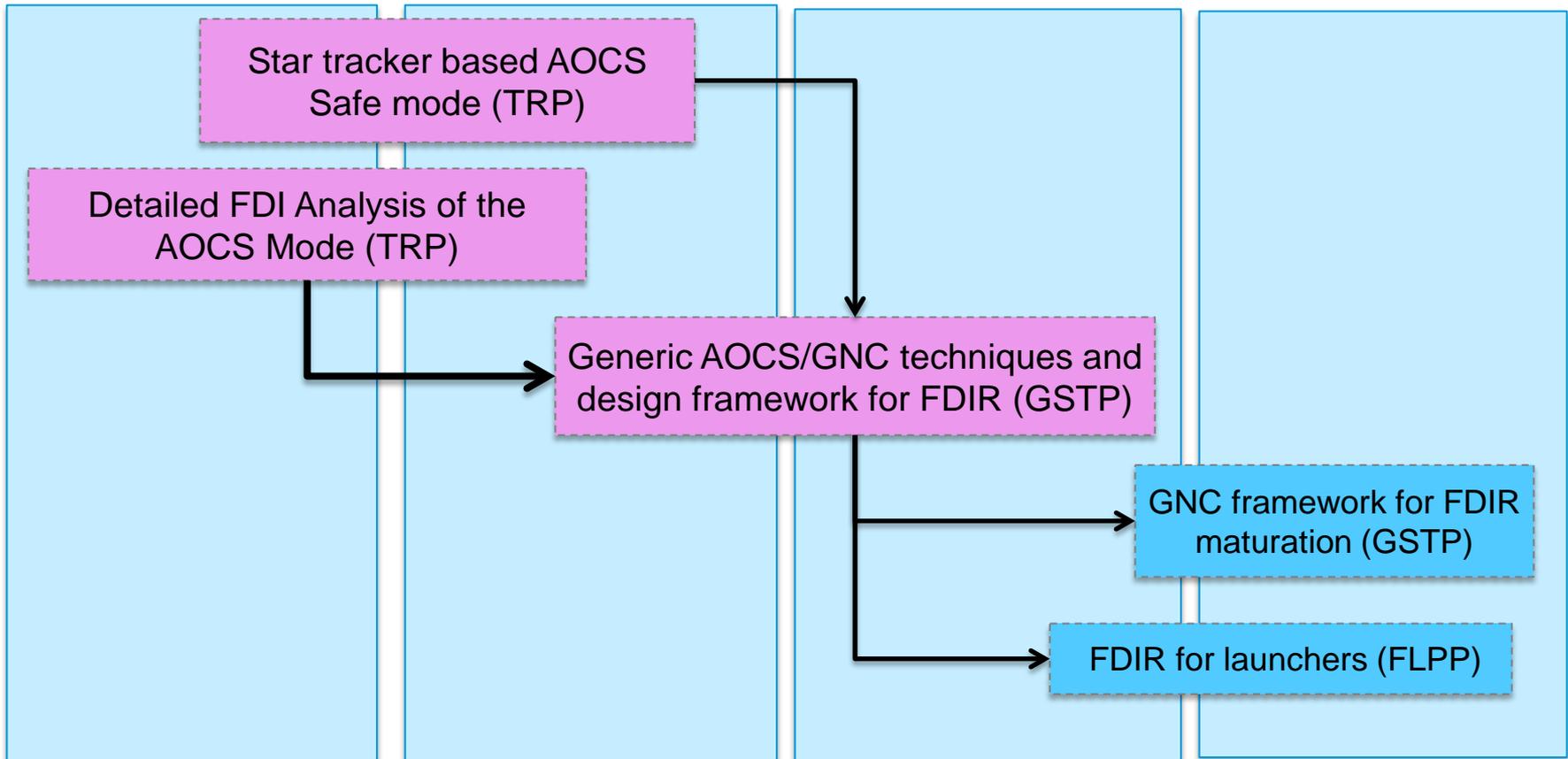
- Create an FDIR community:
 - Exchange experiences, identify best practices, identify potential tool and process needs and improvements
 - Consolidate knowledge: towards FDIR handbook

- Establish FDIR as an engineering discipline
 - Unification across industry to further support interoperability (through SAVOIR and ECSS)
 - Provide means to better support ISVV early in the life cycle

TEC-SW activities roadmap



TEC-EC activities roadmap



1. State of practice in European industry
 - OHB (Brahm, Tipaldi)
 - TAS (Pasquet)
 - AIRBUS (Lautenschlaeger)
2. FDIR in micro-satellite avionics (Lianxiang)
3. FDIR in networked systems: the LCM approach (Martignano)
4. State of art in European academia
 - FBK (Cimatti, Bozzano)
5. Panel discussion (chaired by Oganessian and Girouart):
 - What level of progress has been achieved since ADCSS 2011?
 - What challenges remain to be addressed?
 - FDIR does not stop at company borders: what type and what level of coordination is required across the space industry?