Breakout_B-6 (can map to issue name later)

Issue: https://github.com/CFDSI/Kickoff_Workshop/issues/15
Related Issues:

Issue Statement: URSSI (urssi.us), IDEAS (ideas-productivity.org), and other projects are focused on improving scientific software and productivity. What specific tools, processes, and practices are likely to require specialization to meet the needs of the fluid dynamics community?
Discussion topic:
Moderator: Mike Park
Note taker: Dan Katz
Reporter: Damian Rouson
Group Members:
- Damian Rouson
- Dan Katz
- Mike Park
- Kenneth Jansen

Please address these topics in your discussion (moderators please make sure that

there is enough time to cover all three before the session ends).

1. Describe the ~~problem~~ opportunity:

- Need sustainable software for the product lifecycle, from concept to development to maintenance
- Some issues are general, some are specific, some are general but have specific elements
- Different groups (CFDSI, URSSI, IDEAS, SGCI, etc.) that have some possible overlap
    - Probably can't say that one has responsibility and one doesn't
    - Inefficient for CFDSI to do everything that URSSI does, and also for URSSI to learn everything needed to work deeply with CFDSI user community
- Some issues are general, some are specific, some are general but have specific elements
- Some issues may be unclaimed, for example between CFDSI and URSSI, training developers to use new technologies/architectures (e.g. GPUs, UQ) - not a clear fit for either necessarily, but certainly important to both.
- Some people in a community lead (prototypers), can follow them and take the

successful ones and move them into production
- Disciplines that work with PDE solvers need affordable verification that can be put into (semi-)continuous integration (this is beyond unit tests, more like acceptance testing)
  - What part of this is specific to CFDSI?
  - What part could be done by URSSI?
  - What part could overlap with other PDE-solving communities? (maybe still in URSSI?)
- URSSI could see interactions and commonalities across multiple disciplines, particularly as related to some technologies (performance, debugging, etc.)
- Education and training - need folks who can teach who know the technologies well but can do this in the context of examples, applications, and concerns that the audience can relate to
- IDEAS overlaps URSSI, but more focused on high-end processing and performance, slightly fewer disciplines, also building SDK, providing library rules, emphasis on use of solvers

2. What are potential solutions?

- Need to define and agree on overlap areas, both can work together, but should agree on how to do this
- Figure out what needs to be specialized for CFD that can be done more generally by URSSI
- Joint help desk policy - who should deal with which user issues, how do they get handed back and forth? (maybe a help desk that crosses all institutes will be needed)
- Perhaps a role is needed where institutes hand generalized problems to URSSI (or to some institute consortium) so that that group can look for commonalities and start efforts to solve them jointly, with the institutes. Or take lessons/successes from one and apply them to others.
- URSSI could train trainers from different institutes (e.g., CFDSI) who then adapt material to fit their institute and teach to that community
  - Perhaps The Carpentries is a layer higher, or perhaps URSSI can be replaced by The Carpentries here
- CFDSI could provide test suites and test problems/solutions that could be used in a larger system, but customized

3. What can CFDSI do to help?

- See above (#2), these are the same for this issue

4. Misc ideas so they don't get lost (e.g., Did you find new issues? If yes, create the

issues on GitHub!):

-

5. Summary for report-back (Alternatively, just bold the key points above):

    ● Need to define and agree on overlap areas; multiple institutes can work together, but should agree on how to do this
        ○ Overlap could be between SGCI and CFDSI, or SGCI and CFDSI and URSSI, SGCI and CFDSI and URSSI and IDEAS, etc.
    ● Many items fall in the role of URSSI (training, testing, advanced architectures, etc.). CFDSI can come in with more specific knowledge that can be used to customize these items for the CFDSI audience:
        ○ CFDSI can develop and integrate CFD-specific use cases for training researchers.
        ○ CFDSI can identify those aspects of general best practices that are most suitable for use in CFD: as an example, construct unit tests for continuous integration by capturing procedure input/output in situ.
    ● Need to define a coordination plan between multiple institutes
        ○ None can do everything, so divide up the problem to work together
        ○ Perhaps a joint help desk policy is needed - defining who should deal with which user issues, how issues get handed back and forth
        ○ Maybe a help desk that crosses all institutes will be needed
    ● Perhaps a role is needed where institutes hand generalized problems to URSSI (or to some institute consortium) so that that group can look for commonalities and start efforts to solve them jointly, with the institutes. Or take lessons/successes from one and apply them to others.