Lesson #1

1. A well-defined process for the establishment of industry/university collaborative research agreements is an important catalyst.
   - especiallyimportant for multiple universities/companies collaborations
   - lack of a well-defined process delayed aspects of formalWARE by more than 1 year

Lesson #2

2. Need good understanding of how research is conducted at universities by potential industry collaborators.
   - grant-in-aid vs. research contract
   - ownership of results
   - roles and responsibilities
     - supervisors, graduates students, post-docs, etc.

Lesson #3

3. Need to anticipate the full scope of intellectual property issues.
   - not limited to ownership of the results of the collaboration
   - “an ounce of prevention is worth …”
     - for each task, identify as early as possible the intellectual property that may be involved in the task
     - written records

Lesson #4

4. All stakeholders need to understand what is expected as “results” from the perspective of other stakeholders
   – non-profit project sponsors
   – sponsoring companies
   – faculty
   – students
   – end-users

Lesson #5

5. “one to one” research collaborations can be very successful.
   - e.g., Day (UBC) and Pelletier (Hughes)
   - how do these “one to one” collaborations start ?
   - what are the risks/benefits for the individuals ?

Lesson #6

6. When trying to change an established process within the industry organization, management "buy-in" may be necessary, but is not enough.
   - need to convince "team leads" of benefits
   - management needs to show "buy-in" by allowing team leads to take some risk

Lesson #7

7. “Embedded researcher” concept extends the capability of research faculty to be “on site”.
   - graduate student serves as the eyes and ears of his/her supervisor

Lesson #8

8. A detailed plan, especially in the case of multiple organizations, is important and needs to be developed iteratively.
   - more than a re-statement of research objectives
   - refines research objectives into specific tasks
   - must demonstrate a correspondence between requested/available resources (people, time and funds) and specific tasks

Lesson #8 (continued)

- for research, unlike development, can’t fully anticipate deliverables at the start of the project
- hence, “tasks” should not be associated with too closely with specific “deliverables”
- part of the research effort is determinng what the deliverables should be
- the task-oriented plan should eventually be replaced by a deliverable-oriented plan

Lesson #8 (continued)

- for a ASI SRP style collaboration, we suggest an iterative approach:
  - iteration #1 - main part of the proposal submission
  - iteration #2 - project commencement
  - iteration #3 - approximately month 3 of the project
  - iteration #4 - when approximately 2/3's of the project schedule (time) has been spent

Lesson #9

9. Measure “%complete” initially in terms of “tasks”, but eventually in terms of “deliverables”.

Lesson #10

10. Track effort (# of hours) and progress (% complete).
    - weekly reports to a central “project office” by individuals
    - can be done without university/industry “culture clash” but must be done carefully
        - e.g., graduate students are not “employees”
    - feedback to project members is important

Lesson #11

11. Need common technology for co-production and internal communication.
    - e.g., “LaTeX” is often preferred at universities for documents, but not necessarily in industry
    - use HTML on the WWW not just for dissemination of results, but also minute-by-minute, one-to-one communication between project members working at different sites

Lesson #12

12. Two separate roles for research project leadership: “management” and “technical direction”.
    – for substantial collaboration, both roles are needed as “glue” between the different organizations
    – unlikely that a single person can do both roles effectively