LLE Management Responses to the Omega Laser Facility Users Group Recommendations
(written in response to OLUG recommendations of 1 May 2009)

OMEGA (60 Beams)

1. Penalty and conflict information would help: e.g., pointing, framing camera moves, phase plates, etc.

   Response: The LLE website will be modified to make it easier to find this type of information.

2. Desirable to be able to drive any legs from any driver—becomes a major problem for x-ray Thomson scattering

   Response: Will submit a project in FY10 for evaluation. Cost and schedule are currently unknown. Significant resources are likely to be required.

3. Need more static x-ray pinhole cameras

   Response: OMEGA H8 camera now operational. LLE will evaluate TC port allocation for possible addition of fixed PHC's. It may be possible to deploy two or three decommissioned units.

4. Spherical crystal imaging (diagnostic) would be nice

   Response: A crystal-imager project has been proposed by LLE for OMEGA EP, but deferred until FY10. LLE is reviewing the requirements and benefits, but there are concerns that with the high energy of the OMEGA EP beams, significant target heating could shift the K-shell lines out of the imager-wavelength acceptance band. Any suggestions for system requirements are welcome from OLUG. There are currently no plans to provide a crystal imager for OMEGA

OMEGA EP

1. Phase plates with 1-mm spot size are essential to a number of users

   Response: Two phase plates will be available starting in FY10. Four more substrates are on order and will be made into phase plates by FY11.

2. SSD will also matter for a number of possible experiments

   Response: SSD is not planned for OMEGA EP except on the NIF PAM, which will be able to feed Beam 3 in mid-FY10. Implementing SSD on additional beamlines would require significant resources.

3. Strongly endorse adding simultaneous SOP to ASBO

   Response: SOP cabinet location and beam path are part of the OMEGA EP ASBO design package. LLE believes that it has identified a streak camera for the SOP and, if available, will install it on OMEGA EP later in FY09 or early in FY10.

4. Pulse shaping equivalent to NIF capability will help a number of users (100 ps to 30 ns)

   Response: Current architecture does not support >10-ns operation. Evaluating possible strategies to provide this capability as well as shorter pulses. However, operating with individual beam pulse durations greater than 10 ns will require a significant redesign of the front end and significant resources.

5. Spherical crystal imaging would be very helpful

   Response: A crystal imager project has been proposed by LLE for OMEGA EP, but deferred until FY10. LLE is reviewing the requirements and benefits, but there are concerns that with the high energy of the OMEGA EP beams, significant target heating could shift the K-shell lines out of the imager-wavelength acceptance band. Any suggestions for system requirements are welcome from OLUG. There are currently no plans to provide a crystal imager for OMEGA

6. Low-energy probe beams would be helpful including
   - 1ω chirped pulse via an air compressor to allow adjustment
   - 2ω or 3ω would be better
   - Up to 1 J would provide an x-ray option

   Response: A fourth-harmonic probe is in development. It will provide a 10-ps (nonchirped) pulse of 20 to 100 mJ at 263 nm. LLE's goal is to have the system installed in FY10 including light-collection optics that would allow Schlieren imaging and grid refractometry. It will be on a fixed path in the plane perpendicular to the backlighter direction, 60° from vertical.

7. Must somehow develop a record of experience with EMP versus type of experiment, laser intensity, diagnostics

   Response: EMP signatures are currently collected on each short pulse shot on OMEGA and OMEGA EP. Diagnostic EMI-related diagnostic failures are logged by the shot crew when encountered. We will organize and make this information available to users in the near future.

8. Organized penalty and conflict information would be helpful, e.g., blast shield

   Response: LLE will organize and distribute this package shortly. It will also become available on the web site.

General User Issues

1. Earlier assessment of conflicts or problems in the setup; e.g., more access to Scheduling Committee outputs but being able to get this six months in advance would be great. Want to also know what operational delays may be introduced by the initial plan.

   Response: OMEGA management staff are available for advance planning at the request of any user. Campaign proposals can be submitted at any time in advance of the two-month required date. Users can request an early

evaluation of their proposal, although this will not include potential conflicts with other experiments the same week. Users should make this request to John Soures.

2. Establish a link to scientists/engineers/technicians as mentors (as Chuck Sorce does for LLNL).

   Response: LLE agrees with the need for this enhanced liaison function and will support to the limit of our resources. Specific requests are generally supported. Requests for links to LLE staff should be directed to John Soures.

3. Zero interframe timing for x-ray framing cameras would be
   - A standard operating procedure each day
   - Readily available on the web
   - Arrange calibration and testing as a dedicated instrument maintenance block of time.

   Response: These operations currently occur as part of routine operations. We will make this information more readily available to the users in the near future through the website. Calibration and testing where required for data analysis should be included in experiment planning.

4. LLE should host wikis for areas of user interest; e.g., x-ray Thomson scattering, x-ray framing cameras, etc.

   Response: LLE could host a blog forum for users to discuss status of operational diagnostics. Diagnostic status information is currently available on the web site. LLE will explore options that allow user dialogue.

5. Important to keep using Be

   Response: LLE expects to continue to support use of Be at the Omega Facility. We are evaluating the current regulations.

6. Improved links to more information in SRF's and other material, especially for each diagnostic. Include: brief description, contact people, RSI or other reference, procedures, etc.

   Response: Improved documentation including Equipment Qualification package will be linked shortly via SRF web pages.

7. Provide dedicated laboratory space for visiting groups:
   a. Enable preparations without conflicts
   b. Computer linkages in this laboratory or wherever preparations occur

   Response: Dedicated "side-lab" space is currently available in LLE 182, 175, 177, and 6000 (OMEGA EP diagnostic workshop). Additional transient space is available upon request. Ethernet is available, must be pre-arranged. Note that space is limited.

8. Comments on after-shot feedback process
   a. Quality is not entirely satisfying. Overall sense is that 20%, give or take, of the feedback is too hurried or pressured to be accurate. Issues like data quality are often not clear for a while.
   b. Add "Shot Cycle Assessment" line to feedback form

   Response: (a): The Experiment Effectiveness Assessment Form (EEAF) is used for tactical evaluation during shots by the shot crew. Best-effort feedback is the objective. Longer-term issues that take time to sort out should be included in the experimental critique one to two weeks after the campaign. If the information changes after the initial experimental critique is submitted, the user is encouraged to submit a revised critique.

   (b) Users can review shot-cycle information including cause and length of delays in real time on OMEGA Availability on the Operations web site. LLE is considering adding a comment area for shot-cycle assessment to the EEAF.

Information Flow

1. A challenge, especially when not having strong internal connections, despite the fantastic job OMEGA is doing.

   Response: Working on a presentation and table showing users how to use the database system to find specific shot planning and analysis information.

2. Put an x-ray framing camera and streak camera status page up on the web for all user access. Coordination and information flow for framing camera flat fields and signal levels would also be very useful—to improve user planning (see wikis).

   Reponses: LLE could host a blog forum for users to discuss status of operational diagnostics. Diagnostic status information is currently available on the web site. LLE will explore options that allow user dialogue.

3. Implement a search capability to enable all users to find out who has used or is planning to use specific diagnostics or other capabilities (including SRF's and PI's).

   Response: LLE will implement a "recent use" history database of each diagnostic that will be available to users.

4. Implement automatic notification of diagnostic status during run up toward shots that use this particular diagnostic.

   Response: Automated link to blog could be implemented. However, the best way to get this information is for the users to read the Diagnostic Status page.

5. There was a problem with information flow relating to changes in policy about DT fill, although in general, users report good communication about policy changes.

   Response: Formal announcements of policy changes will be distributed via the Scheduling Committee. The committee meets bi-weekly (could the

OLUG mailing list be used to distribute regular notices of changes in facility policy to users?).

6. OMEGA EP Information
   a. Need focus, energy, and regular timing of update
   b. Need to know, ASAP, focus ability versus energy through blast shields in OMEGA EP
   c. Need to know, ASAP, contrast on OMEGA EP
   d. Status of TIM updates needed.

   Response: LLE is actively developing the diagnostics to address these items. We want to make them available ASAP, subject to finite development time and resources. The LLE System Science staff believes that providing accurate information is extremely important and will release information only when they are confident that it is correct. They are actively working on these issues. Item (a) Focus and energy operating envelope is being further explored in the coming months. Item (b) Blast shield use impact is being analyzed and will be disseminated when available. Item (c) A High-Contrast diagnostic is being deployed as a high priority. Initial capability is expected in FY09. Item (d) TIM-10 and TIM-11 will be completed in Q4 FY09; TIM-15 is expected in Q1 FY10. Information will be posted on the Facility News web page.

7. Need regular updates on phase-plate inventories and availability (both OMEGA and OMEGA EP).

   Response: They will be selectable with far-field information on the SRF interface as soon as they are available. Much of this information already exists online in the DPP database.

Broader Issues

These issues are beyond LLE's control, but LLE will work with NNSA to address them.

1. *Absence of explicit support for diagnostic development in universities has an increasingly adverse effect on hands-on training in an area of increasingly formal facility operations.*
2. *Concern about availability of small facilities as staging grounds for hands-on training, diagnostics, and experiment development.*
3. *Proceed with HIPER/US workshop to promote joint and complementary research on HEDP physics.*