FDA Draft Panel Questions:

1. The applicant has revised the pivotal radiographic analyses that were initially performed in the PMA. These revised analyses impact a total of 12 patients:

   - seven (7) patients who did not meet the original analysis definition of success at 6 or 12 months and who were radiographic successes at 24 months, but were carried forward as radiographic failures, and

   - five (5) patients who were radiographic failures, but who were considered clinical successes.

   Under the original PMA protocol, the 15% non-inferiority margin delta for safety was not met. The delta is only met by including all of these 12 patients as safety successes. Please comment on the appropriateness of the revised analyses and the impact of these changes on the interpretation of the patient safety and overall safety success rates for the study.

2. Fractures of the mobile bearing have been noted in the applicant's informal retrieval analysis. Fractures have also been reported in literature. Functional wear testing performed by the applicant has not replicated this clinical failure mode. The compressive load used during testing is less than half of what the Agency considers worst case.

   Though fracture rates are relatively low, please comment on the adequacy of the functional wear testing and please discuss whether any additional pre-clinical testing would be helpful to address long-term device durability.

3. The continued access (CA) cohort consisted of 424 patients. At the time of PMA submission, the applicant indicated that 320 patients were expected for 24 month follow-up. Information was collected on 211 subjects (66%, 211/320). The applicant conducted a radiographic review on subjects included in the first CA study (150). 120 patients had a 24 month visit included in the database. 85 patients had radiographs digitized and available for analysis. 80 radiographs were ultimately reviewed.

   Please discuss whether the data available from the CA cohort are adequate to determine if the safety success rate is comparable to the control group.

4. Under CFR 860.7(d)(1), safety is defined as reasonable assurance, based on valid scientific evidence, that the probable benefits to health under conditions of the intended use, when accompanied by adequate directions for use and warnings against unsafe use, outweigh any probable risks. Considering the additional risks of surgical complications for the subject device, please discuss whether the clinical data in the PMA provide reasonable assurance that the device is safe.

5. Under CFR 860.7(e)(1), effectiveness is defined as reasonable assurance that, in a significant portion of the population, the use of the device for its intended uses and conditions of use, when accompanied by adequate directions for use and warnings against unsafe use, will provide clinically significant results. Considering the study outcomes, please discuss whether the clinical data in the PMA provide reasonable assurance that the device is effective.

6. The applicant compared the surgical complications of the pivotal patients to the first 15 patients of the continued access to the remaining patients from the continued access study. In addition, the applicant looked at 3 investigators who only participated in the continued access study and concluded that a 15 patient learning curve was apparent.

   Please comment on the adequacy of the proposed training program (Tab 10) to ensure sufficient surgeon preparation and knowledge of the surgical procedure.

7. The applicant has made and proposed numerous modifications to both the surgical technique and instrumentation during the course of the studies. The applicant has indicated that these modifications are adequate and have contributed to a decrease in the adverse events associated with implantation of the STAR Ankle from the pivotal study to the continued access.

   Please comment on what, if any, additional recommendations or modifications you would suggest regarding the Surgical Technique and Instruments available for insertion of the STAR Ankle.

FDA Draft Post-Approval Study Question:

NOTE TO PANELISTS: ***FDA's inclusion of a section/discussion on a Post-approval study in this summary should not be interpreted to mean that FDA has made a decision or is making a recommendation on the approvability of this PMA device. The presence of a post-approval study plan or commitment does not in any way alter the requirements for pre-market approval and a recommendation from the Panel on whether or not to approve a device must be based on the pre-market data. The pre-market data must reach the threshold for providing reasonable assurance of safety and effectiveness before the device can be found approvable and any post-approval study could be considered. The issues noted below are FDA's comments regarding a potential post-approval study should the panel find the device approvable following its discussions and deliberations of the pre-market data.***

8. Within Tab 13 of the Panel Pack, the applicant has proposed to conduct a two-component post-approval study (PAS), which includes:

    - A long-term (8-year) follow-up component with a rate of device revision or removal as the primary outcome, and

    - A short-term (12-month) physician learning curve component with a rate of major complications as the primary outcome.

Please comment on the following PAS issues:

a. Radiographic evaluation:
    1. the adequacy of intervals and frequency of radiographic assessment;
    2. the necessity for mandatory radiographic measurements on all patients;
    3. the necessity for radiographic measurements on all patients to be performed by independent radiologists; and
    4. the relevant radiographic parameters to measure.

b. Comparing STAR Ankle arthroplasty to a control (e.g., arthrodesis or another type of arthroplasty) and the specific long-term outcomes to be compared.

c. Addressing the long-term outcome of STAR Ankle patients who experience revision or convert to arthrodesis after STAR Ankle failure, including those STAR Ankle patients who failed in the CAS.

d. The appropriate length of follow-up (8 years currently proposed).

e. Measures to minimize loss to follow-up and compensatory measures taken when it occurs.

f. The sufficiency of the proposed learning curve investigation (5 new surgeons, 125 patients, 12 month follow-up) and the selection of new investigators.