

Re: Graphical Ray tracing on Hangar Floor

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- *From:* Jim Klein <jameseklein@xxxxxxxxxxxxxx>
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"Charles Manoras" <abcdef@uvwxyz> wrote:

<mpate@xxxxxxxxxxxx> wrote

I am looking for a photo that shows optical engineers in some of the large hangars doing optical design of a bombsight?
The folklore goes that they were using chalk on a string to draw the radii of the lenses and then using chalk snap line strings to make the rays on the floor of the hangar. The reason is that a large scale ray trace might have been more accurate and/or much quicker than looking up angles in trig table books. This was of course pre computer and pre calculator.

And how were the refractions performed w/o calculations?
Purely graphically by Huygens construction?
Not very accurate.

Probably with a set of 7 place trig tables and Snell's law and a mechanical desk calculator. It sounds pretty terrible now but as late as the 1950's people used 7 place trig tables and a mechanical calculator like a Marchant or a Frieden. Square roots we performed iteratively with plus, minus, multiply and divide.

Designing a 7", F/2.5 Aero Ektar can be done in under a day with tolerancing using CODE-V today. In 1941 it probably took 4 to 6 months.

In 1965, that is exactly how we did an orbital element calculation in Astronomy 103a at UCLA. Not even the Grad students could get time on the main frame.

Like they said in the Virginia Slims advertisement, we've come a long

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way baby".

James E. Klein

jameseklein@xxxxxxxxxxxxxx

Engineering Calculations

<http://www.ecalculations.com>

ecalculations@xxxxxxxxxxxxxx

Engineering Calculations is the home of
the KDP-2 Optical Design Program
for Windows.

1-818-507-5706 (Voice and Fax)

1-818-823-4121

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