

UWF 300

Optical Layout

The UWF300 uses a prime focus configuration. The main mirror is a high order asphere and in the prime focus we use a 5 Lens corrector to correct any field aberrations in a wavelength range from 400nm to 700nm.

With the ultra short focal length and wide field it is the ideal telescope for fast sky surveys searching for brighter objects. The resolution with modern small pixel CMOS is nevertheless surprisingly high even with such a short focal length. It can also be arranged in arrays on our DDM mounts.

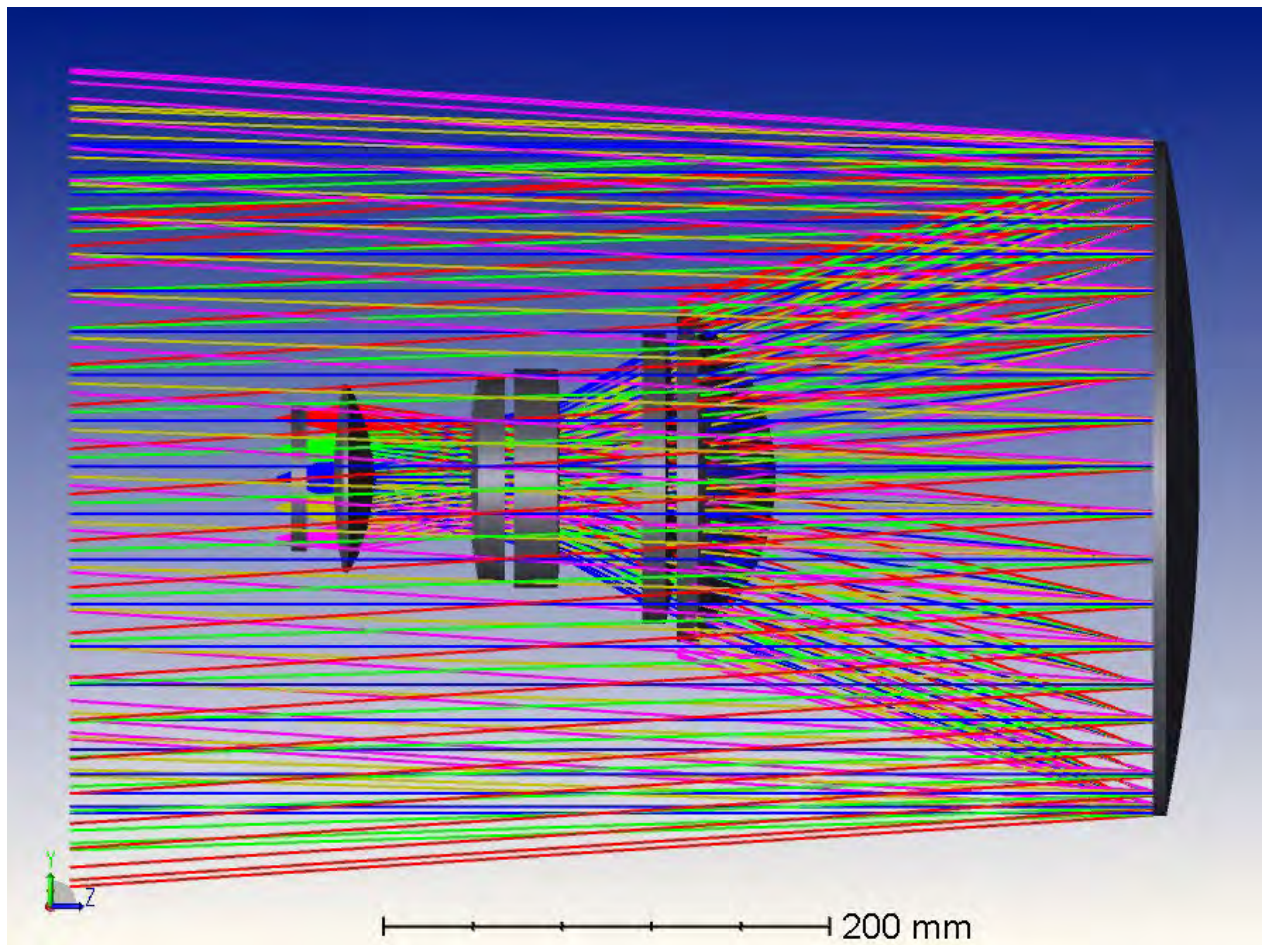


Figure 1 Optical Layout



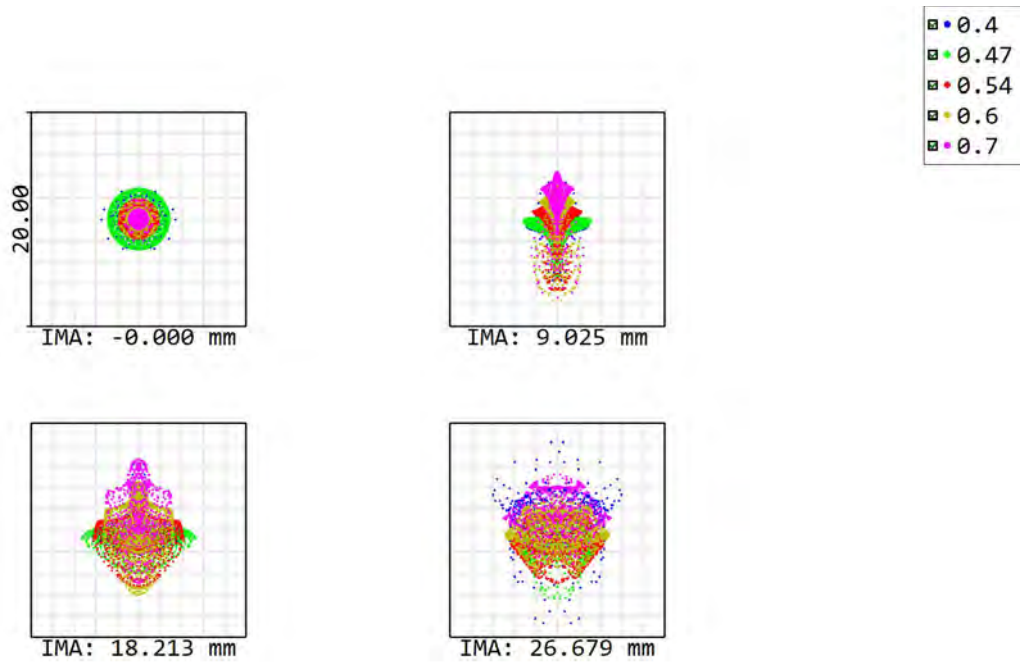
Optical Diameter: 300mm
Field of view: 52mm^{*1)}
Focal length: 393mm
Focal Ratio: f/1.3

Since the back focus is restricted, ASA can offer suitable CMOS/CCD cameras for this system. As with all these ultrafast systems, the system has to be optimized and assembled for a certain filter thickness. While other manufacturers will not care about filter thickness, we do know, that in a f/1.3 light beam even a flat medium with a refractive index $<>1$ causes spherical aberration which has to be included in the optical design for perfect image quality.

The corrector is of course coated with a multi layer AR coating.

*1) The field of view is given as diameter for which the performance was optimized. Since there exist no circular sensors, we often recommend to use a CCD with larger diagonal, since this allows a better usage of the optimized field.

Optical performance



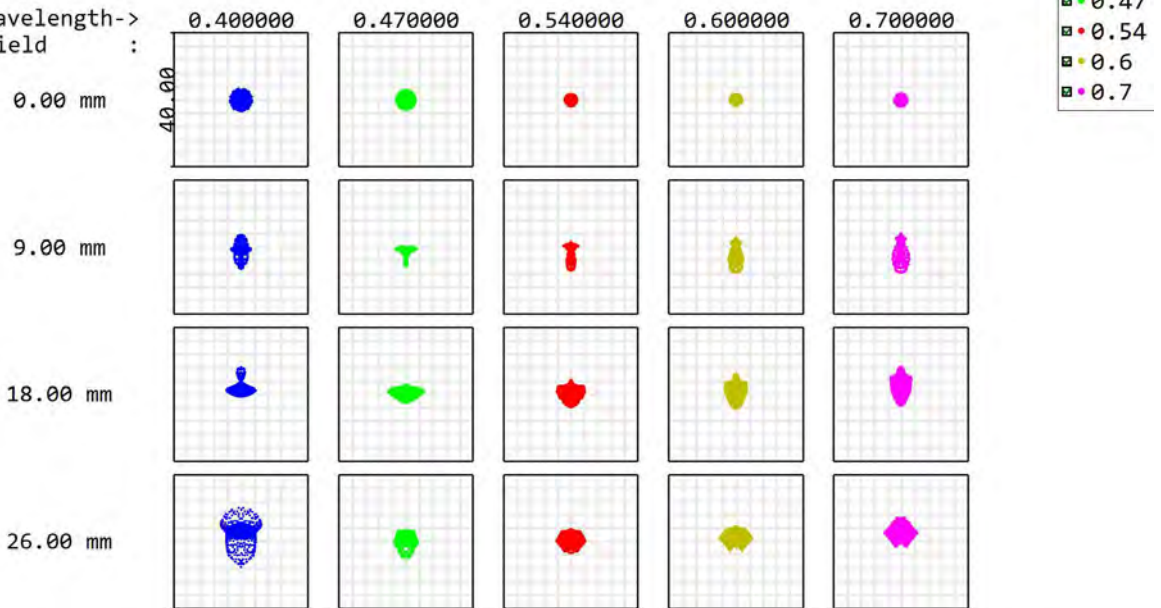
Surface: IMA

Spot Diagram				
UWF300, 6/28/2022				ASA Astrosysteme Austria
Units are μm. Legend items refer to Wavelengths				Zemax OpticStudio 15.5 SP1
Field :	1	2	3	4
RMS radius :	1.441	2.139	2.806	3.106
GEO radius :	3.448	7.609	6.655	8.753
Box width :	20	Reference : Centroid		

Figure 2 Spot Diagram (Box Size is 20 micron)

X = -16.04, Y = -4.062

Wavelength->
Field :



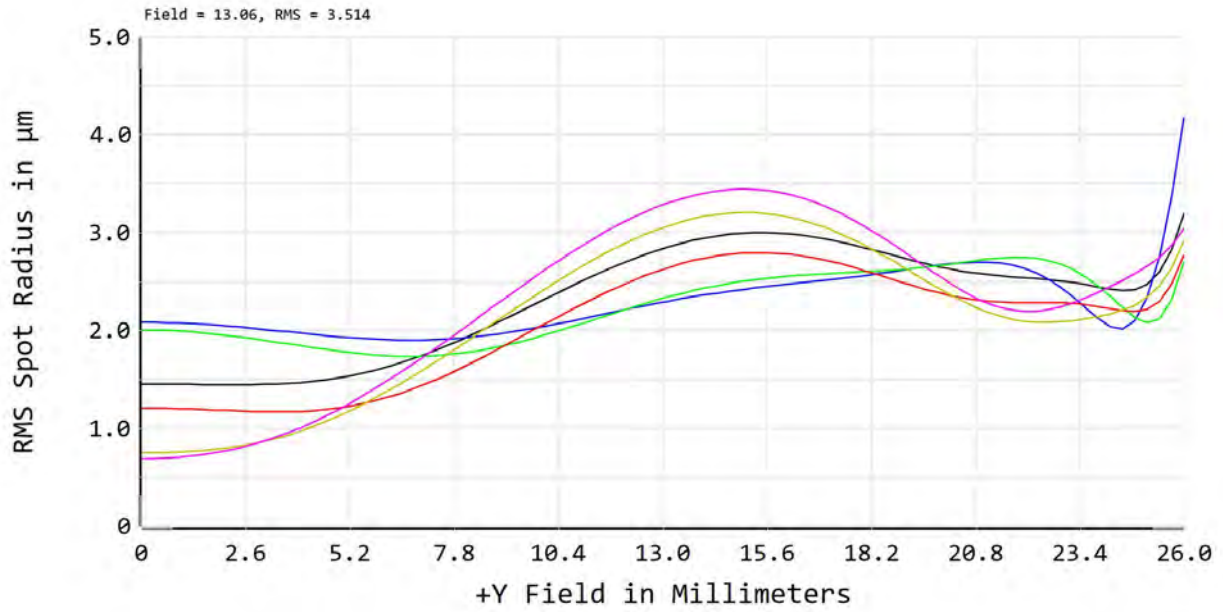
Surface: IMA

Matrix Spot Diagram

UWF300
6/28/2022
Units are μm . Legend items refer to Wavelengths
Box width : 40 Reference : Chief Ray

ASA Astrosysteme Austria
Zemax OpticStudio 15.5 SP1

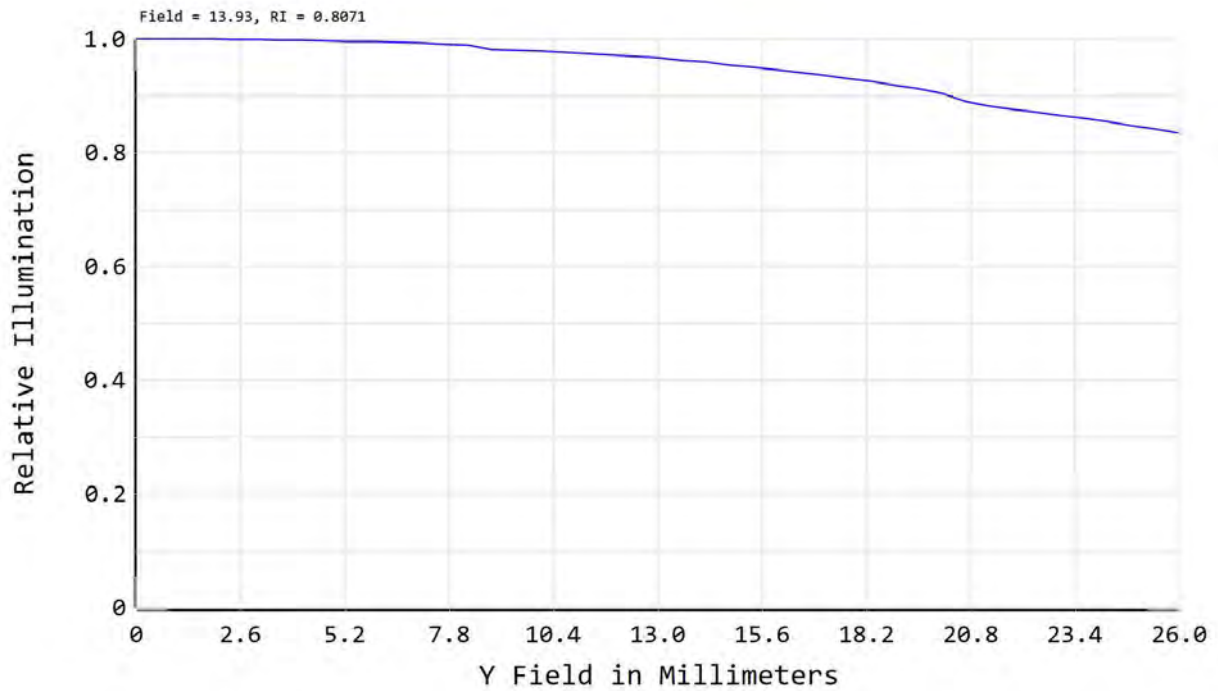
Figure 3 Matrix Spot Diagram (Box size 40 micron)



Poly
 0.4000
 0.4700
 0.5400
 0.6000
 0.7000

RMS Spot Radius vs Field	
UWF300 6/28/2022 Legend items refer to Wavelengths Reference: Centroid	ASA Astroysteme Austria Zemax OpticStudio 15.5 SP1

Figure 4 RMS Spot diameter vs Field



Relative Illumination	
UWF300 6/28/2022 Wavelength: 0.540000 μm	ASA Astrosysteme Austria Zemax OpticStudio 15.5 SP1

Figure 5 Light loss from center to edge

As the below image demonstrates, the UWF300 reaches a unprecedented resolution for a telescope in the 400mm focal length range and shows details and first bright stars in M31 even in 10s exposures).



Figure 6 zoomed image center of M31 with small pixel CMOS

Mechanics

The closed full tube is made of carbon fiber and includes a light shroud. The main mirror can be collimated fully electronic to allow an easy and fast remote collimation.

The electronics for the collimation and focusing is attached to the tube.

The total weight of the OTA is 31kg.

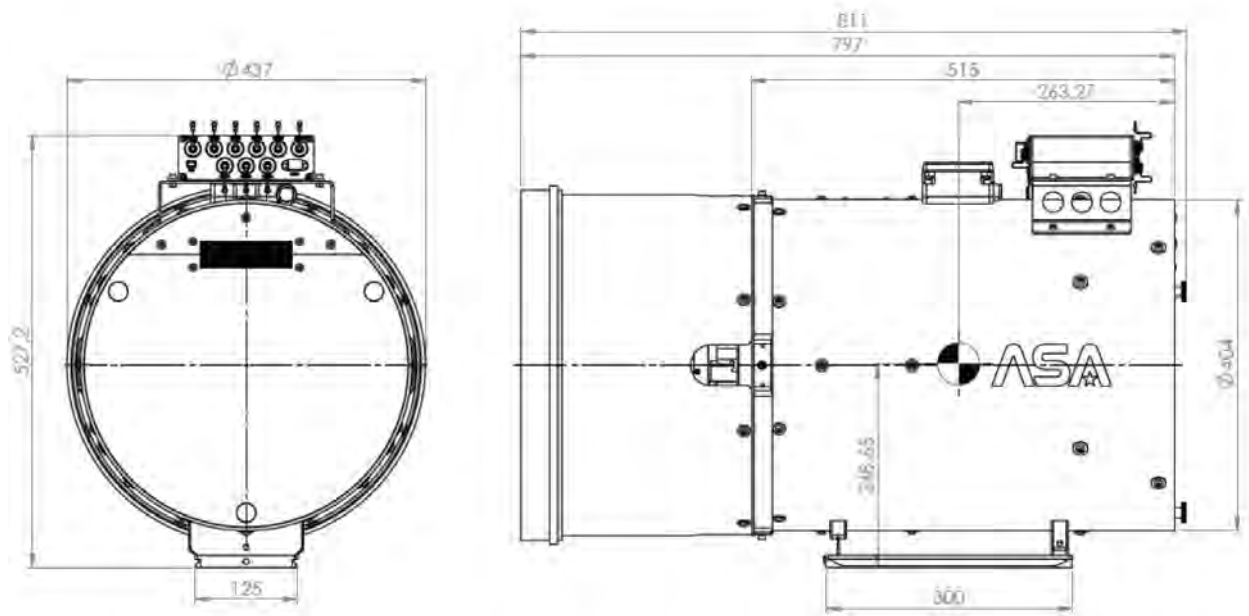


Figure 7 Tube dimensions

