

Callisto



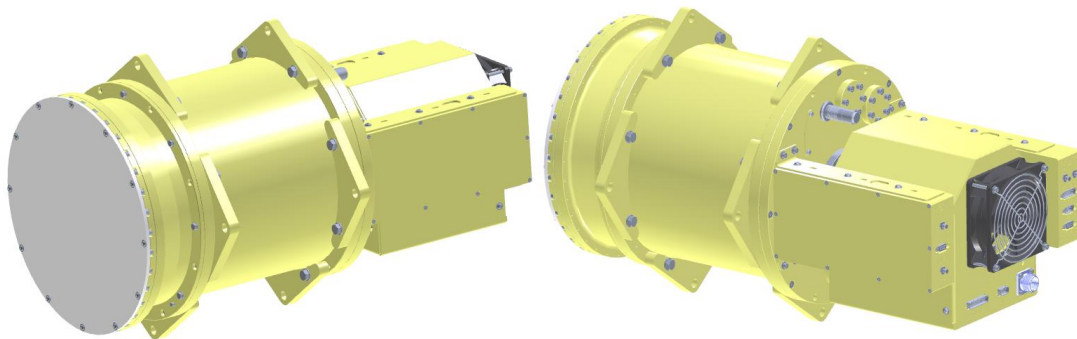
Compact QRFH Cryogenic Receiver for VLBI & Radio Astronomy

Callisto is pleased to announce that **an important milestone has been passed** at the end of 2015 for its new “Compact”, zero maintenance cryogenic receiver including the Caltech designed QRFH feed: **the first light on a VLBI telescope!**

Thanks to the collaboration between Callisto and the University of Tasmania (UTAS), the prototype has been successfully mounted on UTAS telescope in Hobart, Tasmania and first observations have been done with success. This test phase has also brought a lot of useful information on the thermal behavior of the receiver in real operational conditions.

Improvements have been identified to optimize the design of the receiver in order to further improve the RF performance, optimize the input window thermal insulation and the mechanical and M&C design; in order to ease the installation in various VLBI antennas. The prototype unit has been upgraded with these improvements and it is now undergoing a second run of tests on the UTAS antenna to validate the improvements.

Callisto is **also pleased to announce** that UTAS has now placed an order for **the first 3 production units in order to upgrade the entire AuScope VLBI network**. Manufacture of the three units has already started at Callisto.



This new RF receiver has been developed to meet the VGOS specification for VLBI. It could also be used for more general radio astronomy applications.

The design is focused on low maintenance, very low power consumption with Noise Temperature performance that meets the VGOS requirements. This is a state-of-the-art piece of equipment for telescopes all over the world but with particular interest for those operated in remote locations where energy costs are high and maintenance logistics is particularly complex and expensive.

The following table summarizes the confirmed performance of the compact QRFH receiver:

Parameter	Confirmed Value	Comment
Frequency	2-14GHz	
NT	<40K	At Dewar window, excluding external noise contributions (Tsky, Tg, Tant)
Gain	60dB	
Cooldown Time	3h	To reach RF specification
Operation type	Continuous	For at least 5 years without maintenance
Maximum Input Power	<400W	This value is 10 times lower than most of the receivers based on GM coolers.
Weight	<25kg	All included (Receiver, Cryocooler/Compressor, Heat exchanger)
Dimensions	L643mm x W311mm x H311mm	All included: Receiver, Cryocooler, Compressor, Heat exchanger. Diameter without optional support extenders. Length without optional radome and noise probe (overall length incl. these options is estimated below 700mm)

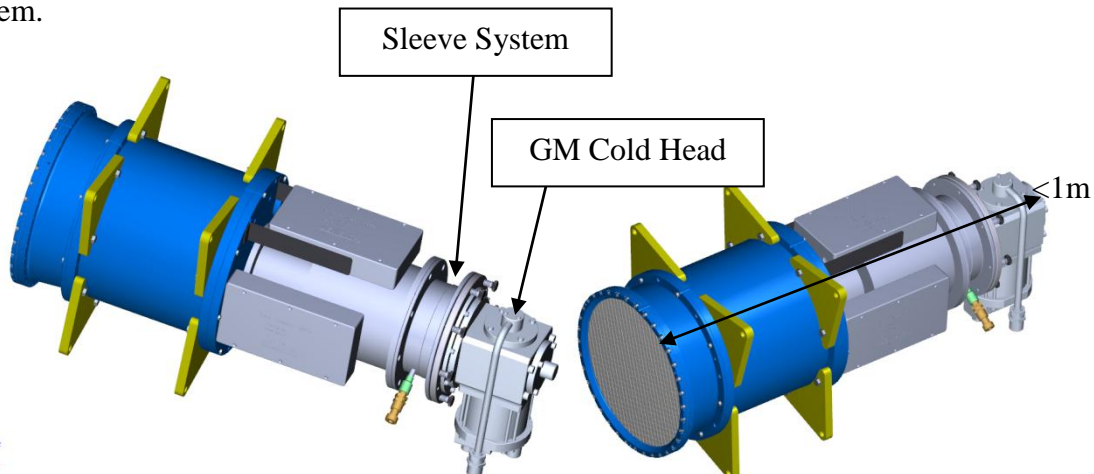
The receiver can be mounted with CalTech’s QRFH feed with flare angle of either 45° or 60°, making it compatible with most of the VLBI antennas.

Callisto can also offer an “Ultra” version of the QRFH receiver. This version, based on a GM cryo-cooler, is intended for users looking for the very best Noise Temperature performance and having no constraints on electrical consumption and regular maintenance aspects.

This receiver will be capable of NT<20K.

However, the physical size, weight and power consumption are larger than for the “Compact” model. As well as this regular servicing is required, but with the benefits of Callisto’s Sleeve system. This thermo-mechanical interface allows for removing a GM cold head from the receiver without dismounting the receiver from the antenna. It is thus not required to realign the receiver to the focus of the antenna after the cold head service.

The following 3D illustrations show preliminary views of the Callisto’s QRFH “Ultra” receiver with GM cooler and sleeve system.



Feel free to contact us for more information on these systems.

<http://www.callisto-space.com/en/contact/index.html>