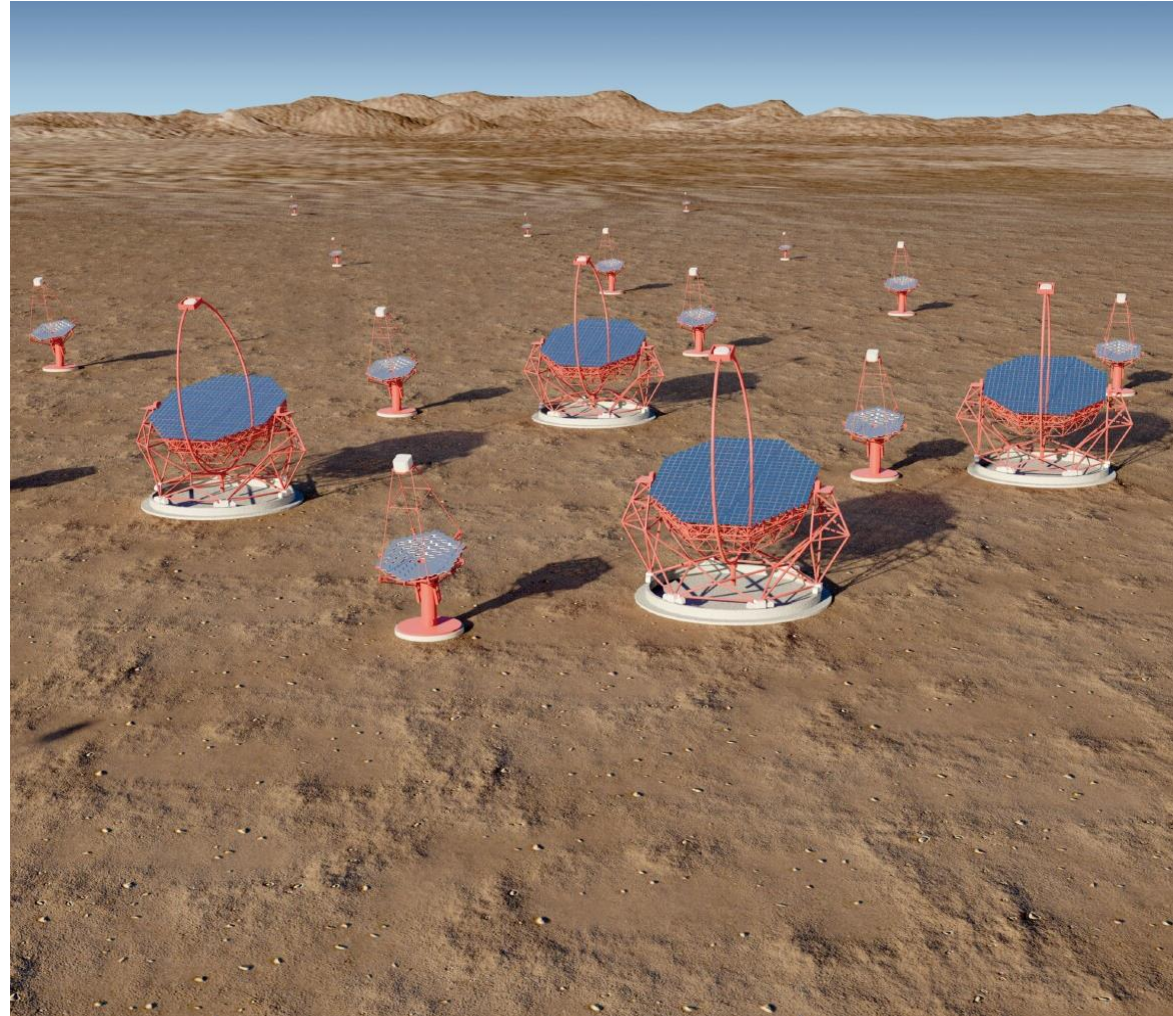


UK participation in CTA

- Overview of progress since January 2017 for:
 - ◆ CTA Consortium (CTAC)
 - ◆ CTA Observatory (CTAO)
 - ◆ The Gamma-ray Cherenkov Telescope (GCT)
 - ◆ Compact High-Energy Camera (CHEC)
- Next steps for CTA-UK



Status of CTA

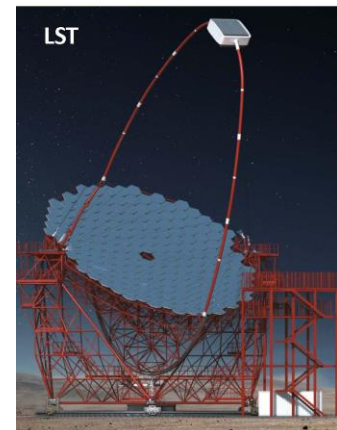
- Progress with La Palma site:



- With Paranal site



- Progress of prototypes:



- Started procedure to change ESFRI status from “project” to “landmark” (implies have moved to implementation/ construction or operation phases).

Status of CTA



- Most recent CTAC meeting in Rio de Janeiro, 15th to 19th May 2017.
- MoU for construction, commissioning and operation of CTA discussed.
- Two membership classes:
 - Category 1)
 - ◆ Contribute in a commensurate fashion to CTAC duties.
 - ◆ Invest in the long-term one half or more of research time in CTAC.
 - ◆ Have well defined contribution (hardware, software, analysis, infrastructure, management).
 - ◆ Can opt-in to all CTAC publications.
 - Category 2)
 - ◆ Do not satisfy above requirements, but bring identifiable benefit to CTAC.
 - ◆ Can be invited to participate in individual CTAC publications.
- Cat 1) members have free access to all CTAC data, software, tools, documents under control of CTAC.
- Finalise at next CTAC meeting in November on La Palma.

Memorandum of Understanding for the
Cherenkov Telescope Array Consortium (CTAC)
during the CTA Construction, Commissioning and Operation Phases

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CTAO progress



- In Kind Contribution process.
- Start from European Spallation Source example:
 - ◆ Need to allow for many contributors from different shareholders (countries).
 - ◆ Require coordinating institute for each IKC.
 - ◆ Council wants relationship between CTAO and coordinating institute to be legally binding.
 - ◆ Relationship between coordinating institute and other contributors can be MoU based.
- For threshold array, allocate following contributions.
 - ◆ North South
4 LSTs 15 MSTs
5 MSTs 50 SSTs
 - ◆ Software blocks
 - ◆ Calibration instruments...
- Later call(s) for baseline array, after all threshold components allocated:
 - ◆ North South
10 MSTs 4 LSTs
 10 MSTs
 20 SSTs

CTAO progress

- Move to Bologna complete.
- Project Committee meetings now held in Bologna.
- New Project Manager hired, Wolfgang Wild:



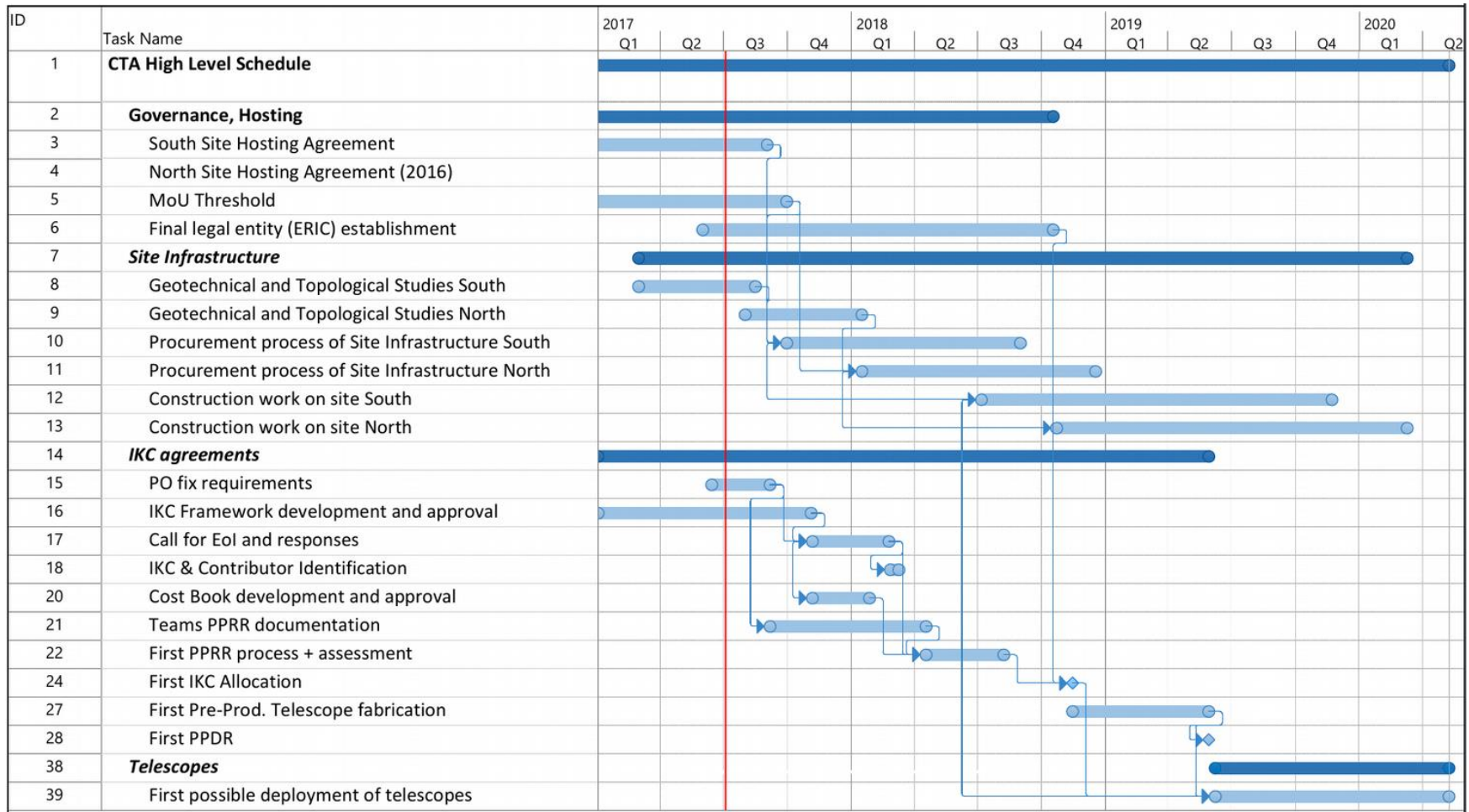
- Full-time from September, some availability before then.
- CTAO now has 20 staff.
- Meeting with ministries on ERIC organised for September.
- Restructured Analysis and Simulations Working Group making rapid progress.
- “Boot camp” in Zeuthen (June) attended by several UK personnel.
- CTA and related software now running at CHEC institutes.
- Meetings organised to present and discuss UK (+ Ireland) analyses.
- Next is in Dublin on 28th August.
- UK work will be summarised by Garrett.

- IKC process – next steps:
 - ◆ Get Council approval of IKC framework.
 - ◆ Issue a call for Proposals for Construction (PfCs) according to the catalogue.
- Each IKC contributor expected to define a lead institution and some management structure, described in an MoU.
- CTAO management receives PfCs and approves, with the support of the In Kind Review Committee, a number of Potential Contributors.
- Potential Contributors undergo Preproduction Readiness Review (PPRR) and IKC assessment with the support of the IKRC.
- IKC agreement (Allocation Agreement) is worked out; could be common for each contribution, or one for each shareholder involved.
- To be approved by Council.
- Start pre-production once PPRR passed.
- Pre-production Deployment Review.
- Commission pre-prod items on site.
- Production readiness review.
- Complete production and installation.

CTA schedule



- As presented at July Project Committee meeting:



Status of GCT

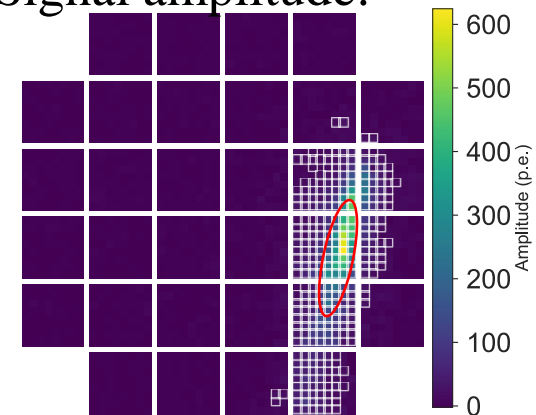
- GCT tests (Paris, March), included tracking of sources.



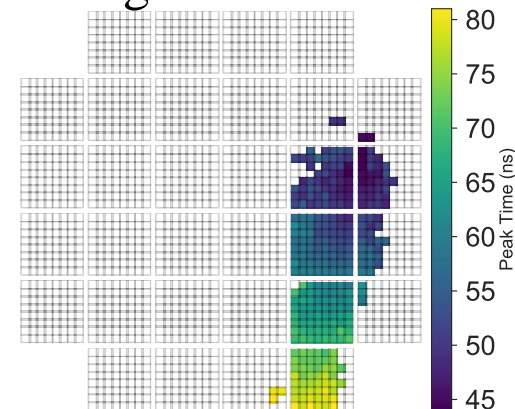
- CHEC-M since operated routinely on telescope by telescope team.

- Example of event taken in March.

- ◆ Signal amplitude:



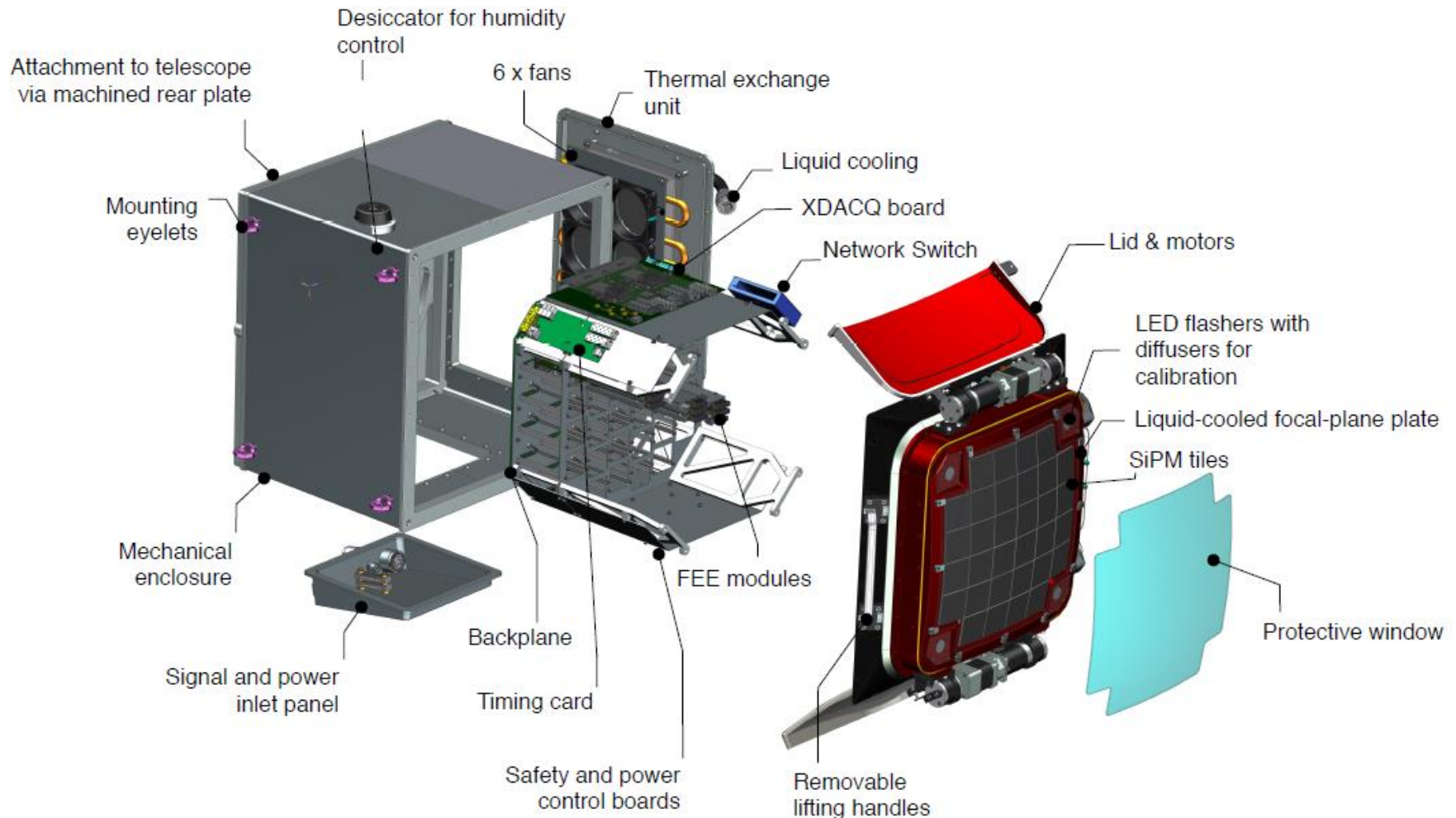
- ◆ Timing:



- ◆ More in Jon's talk.

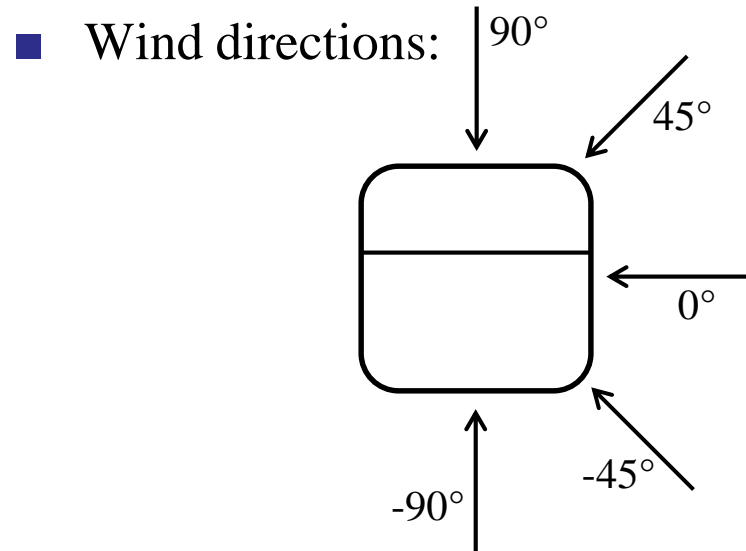
Status of CHEC

- Progress with CHEC-S electronics will be discussed by Jon.



Status of CHEC

- Tested doors in Durham wind tunnel.
- Wind speeds:
 - ◆ 9 m/s (operating, CTA Req.).
 - ◆ 12.5 m/s (transition, CTA Req.).
 - ◆ 15 m/s (operating, CHEC goal).
 - ◆ 30 m/s (closed only, survival, CTA Req.).



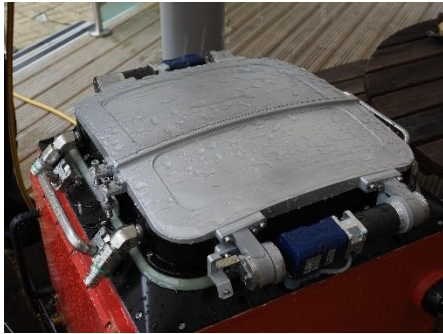
- Opening and closing of doors functioned to 15 m/s.
- Here at 90°, 12.5 m/s:



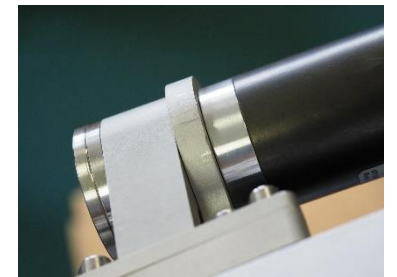
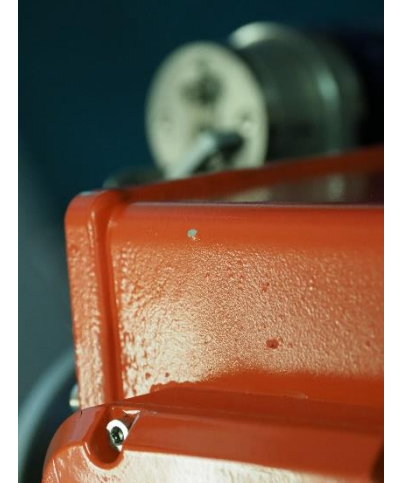
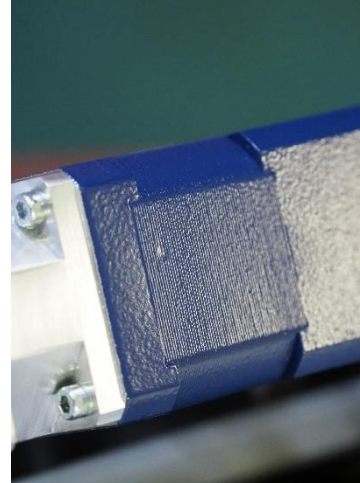
- Camera survived maximum wind speed of 30.7 m/s without problems.

CHEC-S tests

■ Rain test:



■ Hail test:



Next steps for CTA-UK



- Current grant ends June 2018.
- Allows completion of PPRR for CHEC.
 - ◆ CHEC-S is the pre-production camera, with exception of choice of final SiPMs.
- Bridging period 2...3 months.
- Next grant: request funding for UK contribution required for CHEC to instrument of all GCT and some ASTRI telescopes in threshold arrays (MoUs prepared) and for preparation of physics analysis.
- Start end 2018/beginning 2019.
- Run for 3 years.
- Produce CHEC with partners in Australia, Germany, Japan, Netherlands.
- UK will, for all cameras:
 - ◆ Provide Front End Electronics (TARGET modules, FE buffers).
 - ◆ Provide Flasher systems.
 - ◆ Provide doors and door control.
 - ◆ Provide camera windows.
- Assemble 12 or 13 cameras.
- Provide UAV-borne calib. light source.
- Work on CHEC software.
- Contribute to CHEC/CTA pipeline.
- Prepare for early data analysis.
- Sign CTA MoU.