Australian Government

Australian Institute of Marine Science

AIMS Future Research Vessel Update

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AIMS

For IRSO 2023

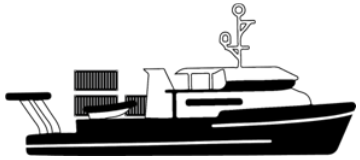
50 YEARS 1972 - 2022

Science for tomorrow's oceans

AIMS Future RV Project

2016 - 2021

2022 - 2024



2025 - 2027

Options & Lobbying	Design & Business Case	Construction & Commissioning
• Political engagement – Australian Government • Internal consultation - **Ongoing** • External engagement (IRSO, RVONZA, Australian Fleet) – **Ongoing** • Collaborations – other scientific and research agencies - **Ongoing**	• Initial business case accepted, and funding provided for design – **July 2022** • Project Manager appointed – **October 2022** • Naval Architect appointed – **December 2022** • Concept Design Review – **April 2023** • Preliminary Design Review – **October 2023** • Detailed Business Case – **January 2024** • Government Budget – **May 2024**	• Production Readiness - **July 2024 to February 2025** • Production - **February 2025 to December 2027** • Acceptance / Operational - **December 2027**

AIMS Future RV Project

Project Objective

"To design and build the next generation of coastal/regional research vessel for Australia – an environmentally friendly, future-proofed marine science platform, capable of supporting work in the tropical environment of Northern Australia for the next 20 – 30 years."

AIMS Future RV Project

By 2028, AIMS will possess a platform with the following capabilities:

- **Enhancing data collection** and transmission of underway information to support a variety of nationally significant scientific programs.
- **Engineered solutions to improve safety outcomes** during the deployment and retrieval of personnel and equipment.
- **Accomplishing existing scientific fieldwork projects** effectively and efficiently.
- **Supplementing existing scientific fieldwork projects** by deploying autonomous technologies as force multipliers and facilitating complementary scientific research.
- **Capacity to upgrade and expanding capability for scientific fieldwork** through the utilization of modular units and additional deck space.
- **Facilitating traditional owner engagement** by providing additional berths for their participation and involvement.

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GETTING READY

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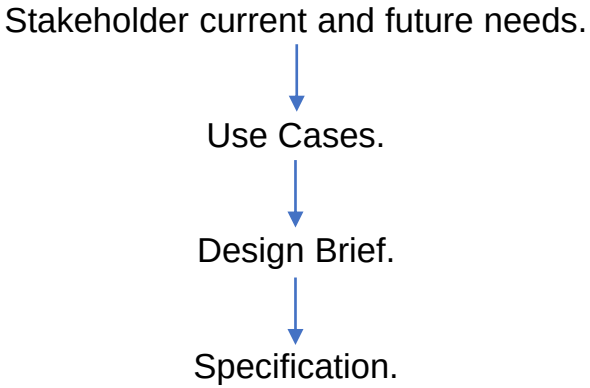
CURRENT OPERATIONAL CONTEXT

- Each year the vessel covers approximately 30,000 nm and completes 270 science sea days delivering 14 to 21-day missions supporting oceanography, water and benthic sampling, scientific diving, marine surveys and hydrography
- Operations are conducted in a wide range of environments - estuaries with large tides and currents, shallow poorly surveyed coral reefs and up to 200 nautical miles offshore.
- Reprovisioning and crew changes often occur at small, shallow ports with limited infrastructure.

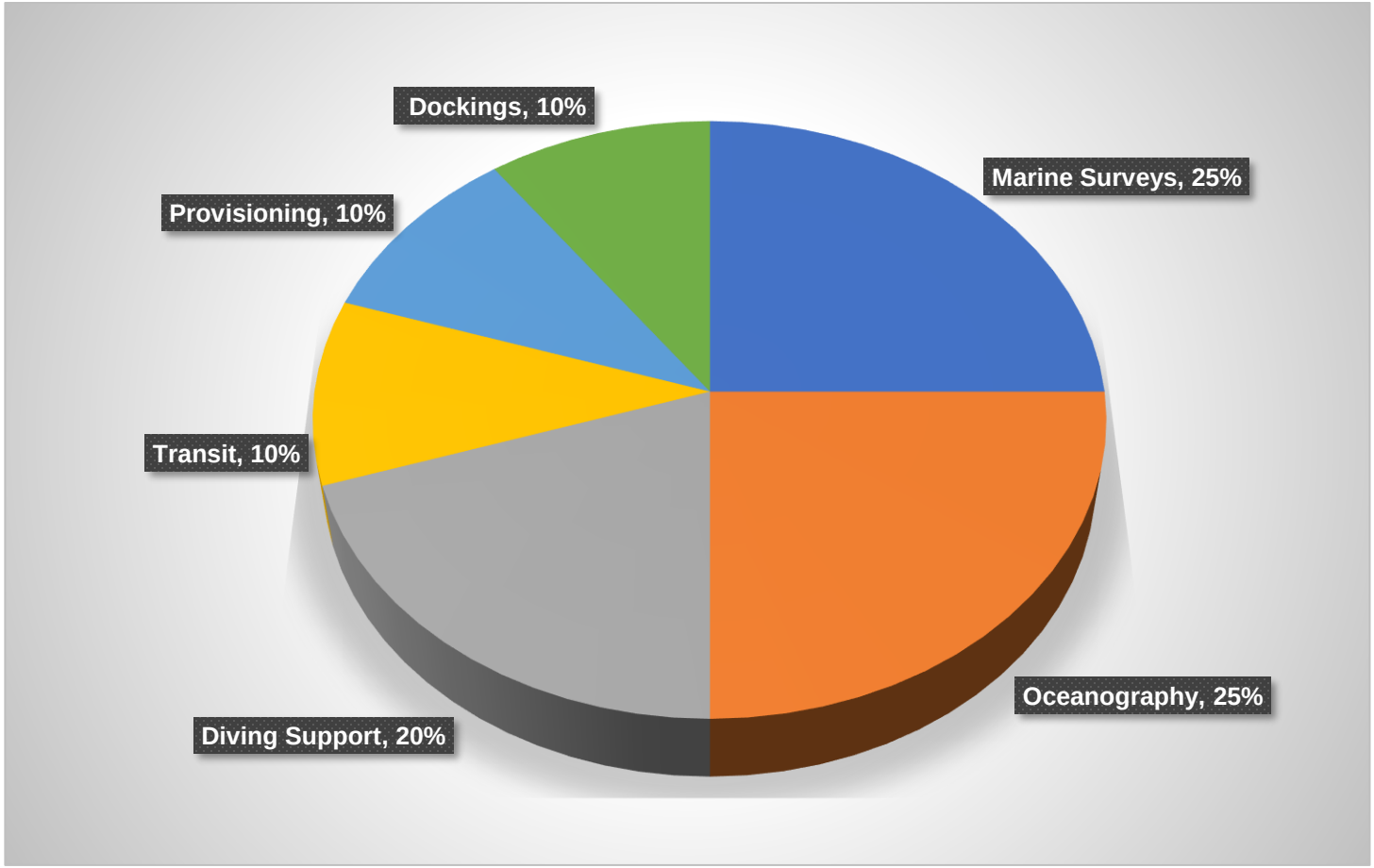
USE CASES – WORKING GROUPS – STAKEHOLDER ENGAGEMENT

- Project Team gathers AIMS and external stakeholder's input into design through Working Groups.
- Development of:



- Working Group input is scheduled with the design consultants to ensure that design input, advice and review data from AIMS and external stakeholders is provided to meet the design schedule.
- Working Groups draw members from the various Science Programs, Strategy Development, Vessel Operations, Underway Instruments / Networking / Comms, Winches / Cranes / Launch and Recovery and Safety.
- Approximately 10% of AIMS staff are consulted directly under the formal Working Group process.

FUTURE VESSEL – USE PROFILE



FUTURE VESSEL – OPERATING MODEL

PRE-VOYAGE

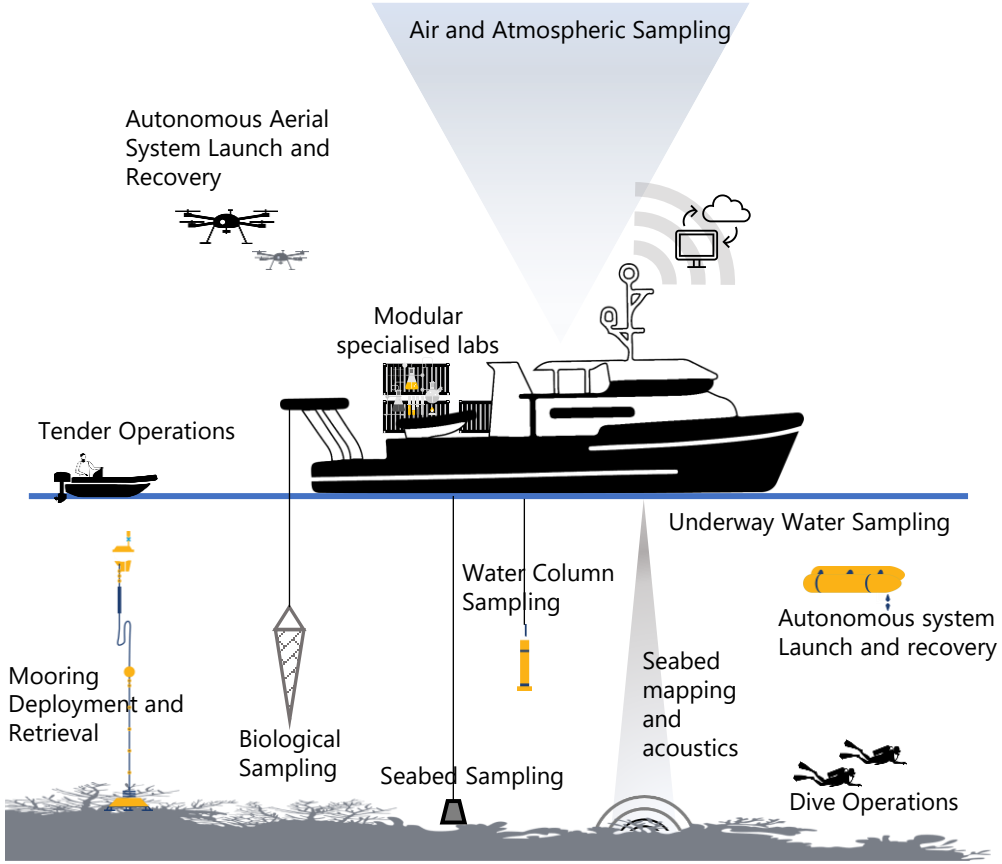
- Science equipment loaded during provisioning window
- More efficient loading through use of modular freighting
- Science boards and vessel departs

TRANSIT

- Underway systems collecting data from a range of streams
- On board technician to assist science team
- Centralised Data management

FIELD WORK

- All existing science capability
- More capable deck equipment, network and communications
- Specialised labs / functions through modular capability
- Safer launch and recovery
- Augmented through autonomous systems



KEY VESSEL REQUIREMENTS

- Vessel Size - Length <45m Beam <16m Draft <3m
- Certification - NSCV 2B Extended (for DCV) Class 100A1 - LMC SPS (for RAV)
- Range - 21 Days 3000 Nm
- Speed - 6-10kn (survey) 12-14kn (transit)
- Personnel - 14 specialised personnel. Day capacity for up to 30 pax.
- Crew - 6 (for DCV) 8 (for RAV)
- Science - Dry Lab Wet Lab Hangar/Workshop Instrument Well Computer Server Room
- Modular Capability - Space on Working Deck for 2+ 20ft Offshore Containers.
- Launch & Recovery - A-Frame Cranes CTD A-Frame Winches (w/conducting wires)
- Boats - Rescue Craft/Workboat Science Tenders
- Positioning - Position Holding Capability
- Propulsion / Power - Hybrid propulsion and fuel saving technology to be considered.

PROJECT PLAN

Funded:

- Concept Design - Feb to Apr 23
- Concept Design Review / Selection - Apr 23
- Preliminary Design Vessel* - Apr to Oct 23 *Working Group Input
- **Preliminary Design Review (PDR) - Oct 23**
- **Shipyard EOI using Preliminary Design - Oct to Dec 23**
- **Business Case for Vessel Construction - Dec 23**
- Detailed Design Vessel* - Oct 23 to Jun 24 *Working Group Input
- Detailed Design Review (DDR) - Jun 24

Planned activities subject to future funding:

- Production Readiness - Jul 24 to Feb 25
- Production - Feb 25 to Dec 27
- Acceptance / Operational - Dec 27

PROJECT BUDGET

Planning Phase

- Funding of $5.2M for design of research vessel – Budget 2022/23.
- Funding covers vessel Concept, Preliminary, and Detailed Design to June 2024.

Delivery Phase

- **Funding to be requested via a specific business case for consideration May 2024 Budget.**
- Funding to cover:
  - Vessel Production
  - Underway Science Instrument integration.
  - Modular Capabilities and Supporting Infrastructure
  - In-Service Support development.
  - *Life of asset operations*

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GETTING SET

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Project Consultants

- Project Manager chosen after competitive tender process.
- ***Gibbs & Cox Australia - a Leidos company.***
  - Leidos - leader in government, science and technology solutions.
  - Gibbs & Cox Australia specialise in naval architecture, marine engineering, naval program management and technical advisory services.
  - Peter Thurling (PM) - 22 years' experience in marine engineering projects in Australia.
  - Contracted to AIMS in October 2022 - planning phase (design) with the possibility of extension to the delivery phase (production).

- Design Consultant chosen after competitive tender process.
- ***Glosten Inc***
  - Experienced Research Vessel design consultant.
  - Clients include OSU, Scripps, MBARI and KAUST
  - Mainly design deep draft monohull vessels.
  - Experienced at integration of science instruments and equipment.
- ***One2three Naval Architects***
  - Experienced firm specialising in multihull vessels.
  - Relationships with many Australian shipyards.
- ***Maritime Survey Australia***
  - Role to ensure vessel design meets AMSA survey and Class.
- Contracted to AIMS in February 2023 - planning phase (design) with the possibility of extension to the delivery phase (production).

CONCEPT VESSEL DESIGNS

- 3 x concept designs for AIMS selection.
- Addressed Functional Design Brief (based on use cases)
- Concept Design package included
  - General arrangements/ Main equipment definition/ Basic seakeeping analysis
- Each concept's expected performance was compared to RV Solander.

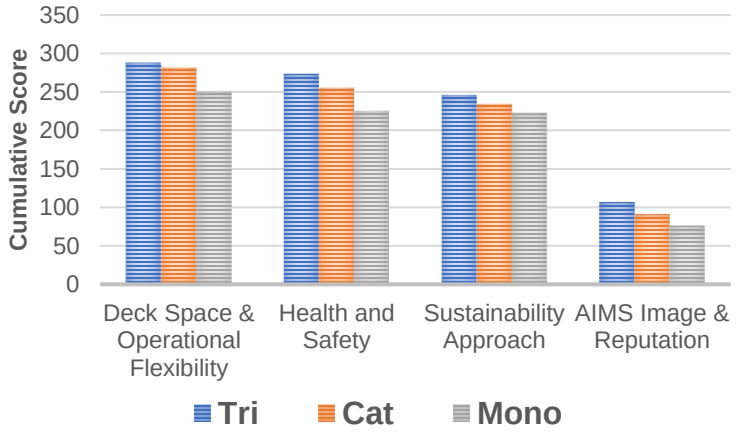
- Evaluation criteria:
  - Seakeeping / Stability Study
  - Margin Allowances
  - Lifecycle Costs
  - Health & Safety
  - Deck Space & Operational Flexibility
  - AIMS Image & Reputation
  - Sustainability Approach

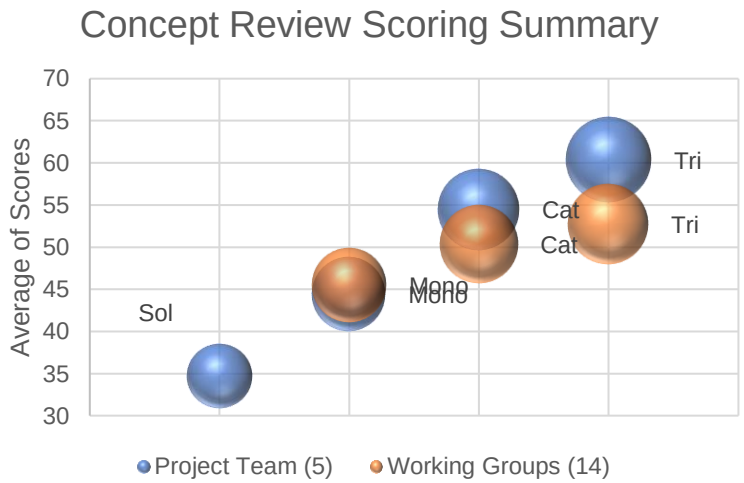
CONCEPT EVALUATION

ANALYSIS:

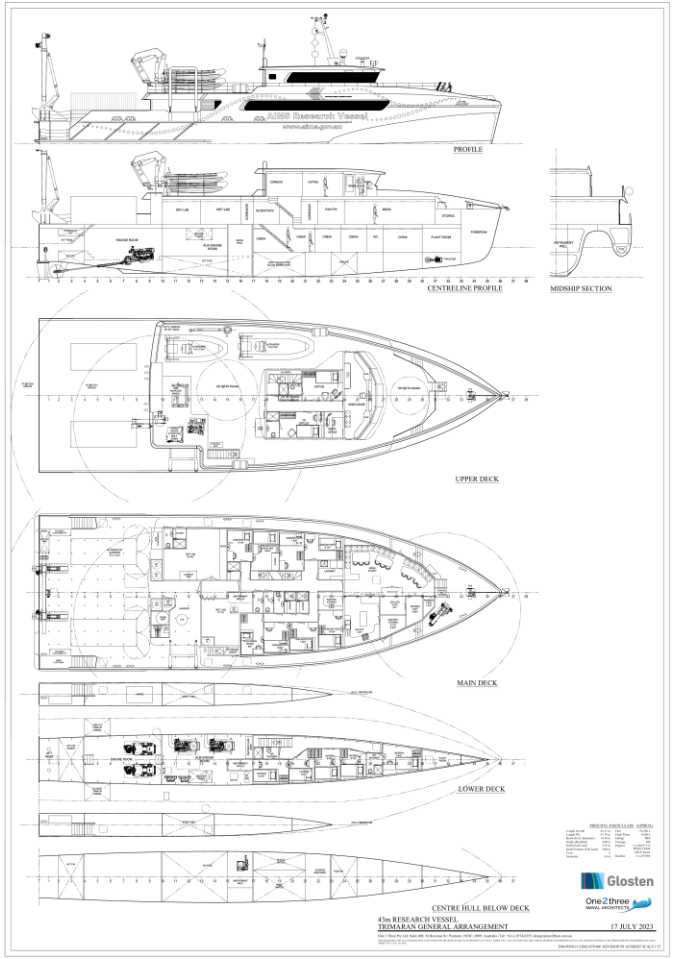
- Qualitative evaluation of Health & Safety, Deck Space & Operational Flexibility, AIMS Image & Reputation, and Sustainability Approach
- Average score Monohull = 45.2
- Average score Catamaran = 51.5
- Average score Trimaran = 54.8
- Score of 2 (Acceptable) for all criteria = 40 So all concepts were acceptable.
- Qualitative analysis were combined with results from seakeeping, margins and lifecycle cost analysis.
- Rank

	Trimaran	1
	Catamaran	2
	Monohull	3





CONCEPT SELECTION - TRIMARAN



- **Closest alignment with Design Brief criteria.**
- **Best seakeeping.**
- **All science on a single deck.**
- **Largest flexible deck space.**
- **Engine/machinery spaces support evolution to future fuels/tech**
- **Key issues identified by working group can be incorporated in designed:**
  - Tender ops/loading/manual handling
  - Water Access/Freeboard
  - Equipment deployment/retrieval
  - Permanent vs modular equipment (diving)

PRINCIPAL PARTICULARS (APPROX)

Length Overall	43.13 m	Fuel	56,200 L
Length WL	41.79 m	Fresh Water	9,500 L
Beam (Excl. Sponsons)	14.20 m	Sullage	TBD
Depth (Moulded)	4.80 m	Tonnage	498
Draft (Full Load)	2.75 m	Engines	2 x MAN V12 D2862 LE444 with E-motor
Draft Extreme (Full Load)	3.00 m		
Crew	8		
Scientists	14+4	Gearbox	2 x ZF3050

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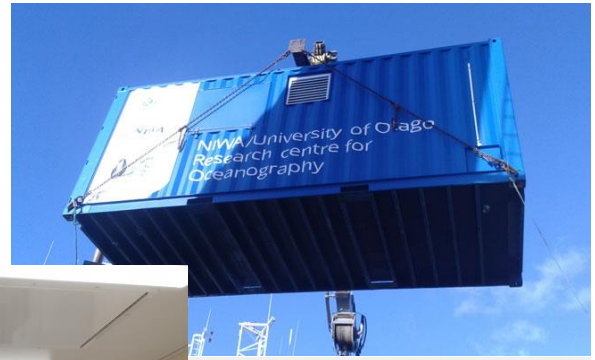
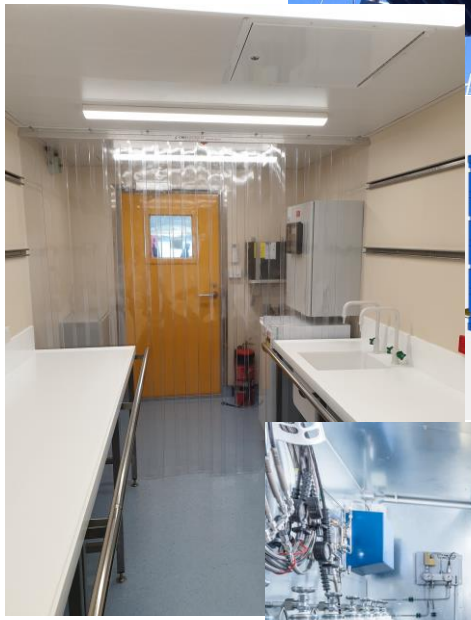
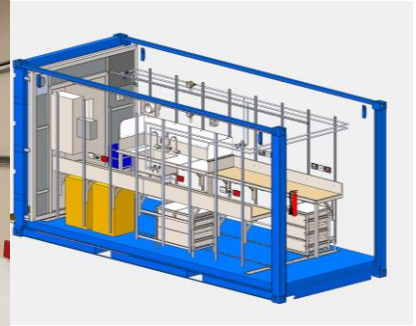
MODULAR CAPABILITIES

- Based on standard 20ft shipping container/ certified to class rules.
- Connected to ship via standard interface - power, water, drainage, alarms etc.
- Used by AAD and CSIRO MNF.
- Modules can be designed for specific marine science (e.g. aquaria) or can be general purpose.
- Containers can be configured on land for specific science missions prior to loading.
- Modules planned include dive spread, autonomous systems, specialised labs, workshops, moorings, refrigerated and general and bulk stowage.
- Limited only by imagination!







NEXT STEPS

- Preliminary Design Review – October 2023
- Expression of Interest to Shipyards – October to December 2023
- Expression of Interest to Module Design/Constructors – September to November 2023
- Detailed Design Phase – October 2023 to June 2024
- Business Case to Government – December 2023 to May 2024
- RFT to down selected Shipyards – June 2024 (*subject to funding approval*)
- RFT to down selected Module Design/Constructors – post June 2024
- Shipyard in Contract – 4th Quarter 2024

THANK YOU

Thank you to the IRSO community for sharing designs, future directions, trends and experiences.

It would be impossible to continuously improve in this space without the Millions of Dollars of intellectual property you all share so willingly

For those that are interested – all of the procurement activities for the AIMS future vessel will be conducted through the Australian Government Procurement Website :

AUSTENDER WEBSITE: https://www.tenders.gov.au/

Questions?

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